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## АННОТАЦИИ

### Abstracts

#### **Information Model of Precedents in the Judicial System**

*O.A. Bisterfeld<sup>1</sup>, N.S. Bisterfeld<sup>2</sup>*

<sup>1</sup> *Penza Branch of Financial University under the Government of the Russian Federation, Penza;*

<sup>2</sup> *MIREA – Russian Technological University, Moscow*

*Key words and phrases:* database; information model; judicial precedent.

*Abstract:* The article provides an overview of regulatory legal acts, according to which elements of case law are being introduced in the Russian Federation. The purpose of the paper is to create an information model of case data. During the development process, the entities of the subject area are identified, the relationships between the entities are determined, the entities and relationships are implemented in the model. It is assumed that a decision support system based on a database of judicial precedents can be used in preparing a case for trial. The IDEF1X information modeling methodology was used. An information model and a database prototype have been developed; the article provides a description and examples of screen forms.

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#### **An Approach to Controlling the Properties of a Carbon Nanotube Synthesis Catalyst**

*E.A. Burakova*

*Tambov State Technical University, Tambov*

*Key words and phrases:* ionic complex; cavitation; catalyst; model; synthesis; carbon nanotubes; ultrasonic treatment; control.

*Abstract:* The purpose of the paper was to study an approach to controlling the properties of a catalyst for the synthesis of carbon nanotubes, which consists in treating a solution of its initial components with a physical effect. The study of the structure of the solution (catalyst precursor) using modeling suggested that the observed changes in the properties of the formed catalyst are caused by a change in the configurations of the ionic complexes present in the solution under physical influence. The effectiveness of the influence of physical exposure (ultrasonic treatment of the catalyst precursor) on the specific yield and parameters of the synthesized nanostructures has been experimentally confirmed. For the effective use of ultrasound in the process of obtaining a catalyst, a mathematical model of the behavior of cavitation cavities in its predecessor has been developed. The information obtained made it possible to increase the efficiency of the decision-making information support system in the production of a catalyst that provides the synthesis of nanostructures with parameters whose values are closest to the specified ones.

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#### **To the Study of the Service System by Simulation Methods**

*N.S. Veremchuk*

*Siberian State Automobile and Highway University, Omsk*

*Key words and phrases:* visitor dynamics; information technology; queuing system.

*Abstract:* The development of a simulation model of a cafe customer service system in the

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AnyLogic PLE environment using discrete-event and agent-based approaches is described. The operating modes of the cafe are investigated, the periods of formation of queues are noted. The results of an experiment to optimize service and improve the efficiency of the cafe are given. The materials of the article can be used to take measures to improve the efficiency of visitor service.

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### **Simulation Modeling of the Dynamics of People in the Evacuation Mode**

*N.S. Veremchuk*

*Siberian State Automobile and Highway University, Omsk*

*Key words and phrases:* simulation model; pedestrian dynamics; evacuation mode.

*Abstract:* The development of a simulation model of the dynamics of library visitors in the evacuation mode using AnyLogic PLE tools is described, taking into account the agent-based and discrete-event approaches. The materials of the article can be used in assessing the readiness of premises for emergency situations, as well as in the processes of forming the professional competencies of students that meet the requirements of modern education standards.

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### **A Proposal for the Analysis of the False Signal of the Automatic Identification System**

*K.S. Klimov*

*MIREA – Russian Technological University, Moscow*

*Key words and phrases:* automatic identification system; false signals; interference; Information and technical impact.

*Abstract:* The Automatic Identification System (AIS) signal [1] is an information carrier where the message is encoded and modulated (frequency modulation) for transmission over the air.

With the conventional signal demodulation/decoding approach, text messages are obtained, from which the false transmitted by the false signal (FS) is almost indistinguishable from the real one transmitted by the real AIS signal.

The purpose of the article is to develop proposals for the analysis of AIS drugs. It is proposed to detect LS not by direct demodulation methods, but by spectral analysis after the Fourier transform (FT) of signals and displaying their frequency spectra in time (sonogram) in real and post-real time. This method of fast Fourier transform (FFT) allows in contrast to analog signal analysis methods to quickly detect drugs, including automatically.

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### **The Choice of Means of Protecting Personal Data at an Enterprise**

*A.A. Kurdyukov, D.O. Morozov, S.V. Posokhov, P.S. Shubin*

*MIREA – Russian Technological University, Moscow*

*Key words and phrases:* information security; information protection; personal data; subjects of personal data; data processing.

*Abstract:* In this paper, the problem of choosing the means of protecting the personal data of employees of an enterprise was considered, which is solved using the research method – the analysis of legal documentation, as well as the methodological framework in this area. Protected data can be both public and confidential. The purpose of the study is to identify current trends and identify recommendations for the protection of personal data. Two tasks were set: to study the classification of personal data security levels; consider the issue of choosing information security tools to protect personal data in selected systems. The result of the study was the development of recommendations on the choice of means of protecting personal data for enterprises.

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## Designing a Digital Circuit Based on an Adaptive Genetic Algorithm

*Nguyen Ming Hong, Nguyen Tee Thanh, Nguyen Huu Sean  
Le Quy Don State Technical University, Hanoi (Vietnam)*

*Key words and phrases:* digital circuit; hardware evolution; genetic algorithm; adaptive genetic algorithm.

*Abstract:* Hardware evolution is a field of research that uses evolutionary algorithms such as genetic algorithms (GA) to automatically build digital circuits. GA is used a lot in solving software problems, the implementation process easily falls into local extremes. The paper proposes an algorithm that can correct the value of the probability of genetic operations. The proposed algorithm is called adaptive genetic algorithm (AGA). The results of the survey show that using the proposed algorithm for designing digital circuits on a system-on-a-chip platform will reduce convergence time, reduce the number of generations, and increase the likelihood of successful system design.

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## Development of a Methodology for Searching for Similar and Contradictory Wordings in Legal Acts

*M.S. Pavlov, E.M. Portnov  
National Research University "Moscow Institute of Electronic Technology, Moscow"*

*Key words and phrases:* automatic text analysis; text classification; natural language processing; legal examination of documents.

*Abstract:* The hypothesis of this study is that the use of text mining algorithms will significantly speed up the process of legal examination of legal acts. The purpose of this article is to develop a methodology for searching for similar and contradictory wordings in legal acts. The research tasks are to choose a method for calculating the semantic similarity of two formulations, to choose a method for assessing the quality of searching for similar and contradictory formulations, to develop an algorithm for the search system for similar and contradictory formulations, and to highlight the main functional blocks in the developed system. The study used methods for determining the similarity of sentences. The result of the study is a developed methodology for searching for similar and contradictory wordings in legal acts.

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## Automatic Intelligent Recognition of Pavement Defects Using Convolutional Neural Networks

*D.A. Skorobogatchenko, Ya.M. Furman  
Volgograd State Technical University, Volgograd*

*Key words and phrases:* convolutional neural networks; instance segmentation; pavement defect recognition; road diagnostics.

*Abstract:* The aim of the study is to develop a technical solution for recognizing road surface defects from an image. The objectives are to analyze the main tools and methods for recognizing road pavement defects; create a solution for recognizing road surface defects from an image based on several actual models; compare their results. The hypothesis is as follows: modern machine learning models can effectively determine damage to the road surface from the image. It is concluded that the most effective is the use of convolutional neural networks in the problem of instance segmentation, in particular, the Mask R-CNN and YOLOv8 models. In the course of the research, these networks were used in training on a dataset containing selected road damage in the form of holes and cracks, which was the research method. The results of networks after training on practical data are presented and compared, which proved the feasibility of using data from neural network models in the problem of recognizing road damage.

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## To the Question of the Formation of Information Competence in the IT Specialists' Training

*D.A. Filisov, V.A. Rudometkin  
Grid Dynamics Holdings Inc., Tula*

*Key words and phrases:* information competence; competence-based approach in education; professional competence; information technology specialist.

*Abstract:* The article is devoted to the formation of information competence in the training of specialists in the field of information technology. The purpose of this article is to consider the main aspects of the formation of information competence of future specialists in the field of information technology in the context of a competence-based approach in education. The objectives of the article are to provide a scientific and theoretical generalization and analysis of research on the problem of the formation of the information component of professional competence in the training of specialists in the field of information technology; to give a structural characteristic of the information competence and basic conditions for its development. The hypothesis of the article is the assumption that the information component is a key component in the structure of competences of a specialist in the field of information technology and determines the development of other system-forming elements of his professional skills.

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## ChatGPT Deep Learning Model as a Tool for Ensuring Information Security of a Home Computer

*M.R. Khairov, D.O. Morozov, I.I. Abashin, A.M. Kartunchikov  
MIREA – Russian Technological University, Moscow*

*Key words and phrases:* ChatGPT; malware; deep learning; home computer; personal data protection; information security; model.

*Abstract:* This article discusses the problem of ensuring the information security of a home computer, and also analyzes the effectiveness of using the ChatGPT deep learning model as a tool for solving it. The purpose of the study is to test the possibility of using the ChatGPT model to consult the user in the field of basic protection of a personal computer from malware and protection of the user's personal data.

As part of the article, the following tasks were set: to check the effectiveness of using the ChatGPT model to search for information on ensuring the information security of a personal computer, to compare the results obtained by the ChatGPT model with the results that end users can get using Internet search engines, and to identify the most convenient and preferred an option to search for information on the information security of a home computer. As a result of the study, it was found that the ChatGPT model is a convenient tool for informing about the basic aspects of ensuring the information security of a home computer and can be recommended as an effective solution to this problem.

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## Review of Research on the Creation of Intelligent Systems for Determining the Service Life of a Metal Structure

*L.G. Bakradze, E.A. Kalashnikov  
National Research Technological University "MISiS", Moscow*

*Key words and phrases:* thermal imaging control; vibration diagnostics; service life; thermogram; defect detection; system for determining the residual life of a metal structure; data analysis.

*Abstract:* The purpose of the study is to review some studies on the creation of intelligent systems for determining the service life of metal structures. The research objectives are to highlight the advantages and disadvantages of methods for determining the residual resource of a metal structure and, in general, intelligent systems for determining the service life of a metal structure, considers the prospects for the development of research in this area. The hypothesis of the study lies in the possibility

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of calculating the residual resource of metal structures. The study used general scientific research methods. Determining the residual resource of metal structures is an important task in the field of engineering diagnostics. Traditionally, various non-destructive testing methods are used for this purpose, including visual inspection, flaw detection, non-destructive testing methods, acoustic analysis and thermal imaging testing.

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### **Technical Programs and Methods for Managing and Forecasting Migration Flows in the CIS Countries**

*V.G. Vasiliev*

*Russian Academy of National Economy and Public Administration  
under the President of the Russian Federation, Moscow*

*Key words and phrases:* machine learning; optimization methods; labor migration; dynamic modeling; system behavior; economic expectations.

*Abstract:* The purpose of this article is to create a classification model for predicting migration flows in the CIS countries. To achieve this goal, the following tasks were set: to collect and process data for model training; to choose the optimal machine learning algorithm for solving the classification problem; to choose the optimal parameters of the algorithm; train the model on the training dataset; check the quality of the model on the test dataset; to analyze the results. The hypothesis of this study is that using inductive machine learning and classification algorithms, it is possible to create an accurate model for predicting migration flows in the CIS countries. To achieve the goal and test the hypothesis, the following methods were used: data collection and processing using the Python programming language and the Pandas and NumPy libraries; using the K-Nearest machine learning algorithm Neighbors for solving the classification problem; optimization of algorithm parameters using cross-validation; model training on the training dataset using the Scikit-learn library; assessment of the quality of the model on the test data set using the accuracy, precision, recall and F1-score metrics; visualization of results using the Matplotlib and Seaborn libraries. As a result of the study, an accurate classification model was created to predict migration flows in the CIS countries.

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### **Advanced Grid Inverter Simulation and Control with LCL Filters**

*E.Yu. Golokhvastov, A.A. Samoiloa, A.A. Samoilov*

*National Research University MPEI, Moscow*

*Key words and phrases:* renewable energy sources; grid inverters; regime parameters; Clark's transformations; Park's transformations.

*Abstract:* The purpose of the article is to describe the mathematical model of inverters with LCL filters in various coordinate systems. The paper contains systems of equations that fully describe the operation of a three-phase voltage converter with LCL filters connected to the network. The result of the study is the creation of a model in a two-phase coordinate system of a voltage converter with an LCL filter, which will allow to control the voltage of the DC link and alternating current, which will pave the way for further analysis of the system characteristics.

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### **The Development of Methodology for Testing Highly Loaded Systems**

*Zaw Hein, E.M. Portnov, Bain A.M., Thet Paing Htoo*

*National Research University "Moscow Institute of Electronic Technology", Moscow*

*Key words and phrases:* information system; testing; metric; query; index.

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*Abstract:* Quality control of an information system in the process of its development is one of the most important factors for the release of a successful product. The need for quality control grows with the increasing complexity of programs in information systems. The purpose of the study is to develop a methodology for testing high-load systems, which gives a more accurate assessment of the quality of information systems developed according to the spiral life cycle model. The objectives of the study are to analyze existing approaches to increasing the quality of software products, to propose metrics for testing methods and a model for the influence of information system quality factors. The hypothesis of the study is the assumption that quality control of a software product is ensured by periodic calculation of metrics for the current version of the information system, while maintaining the history of all previous metric calculations. The research was based on the methods of system analysis, the theory of information errors and software engineering methods. According to the main advantages of life cycle models, the developed testing methodology provides a more accurate assessment of the quality of information systems developed according to the spiral life cycle model.

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### **Management of Educational Activities of a Digital University**

*T.A. Its, S.G. Redko, A.V. Surina, A.V. Shmakova*  
*Peter the Great St. Petersburg Polytechnic University, St. Petersburg*

*Key words and phrases:* educational activity; digital university; system dynamics; university management model.

*Abstract:* The successful implementation of the concept of a digital university depends on the effectiveness of the process of managing educational activities. The digital transformation of the university is long-term, so a systematic approach to the management of educational activities is needed. Today, there is no single model for managing the educational activities of a digital university. As a rule, various approaches are used to manage certain aspects of educational activities. An integrated approach is proposed, including the analysis of university business processes, their reengineering and simulation using system dynamics methods. The purpose of the study is to develop a system-dynamic model for managing the educational activities of a digital university, which will significantly increase its effectiveness in the context of digitalization. The research objectives are to build a simulation model for managing the educational process of a digital university using the methods of system dynamics; to verify the system-dynamic model on the example of the process “Management of current educational activities” of Peter the Great St. Petersburg Polytechnic University

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### **Application of Voice Control Technology of Guitar Effects Controller System**

*A.I. Karpenko*  
*Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg*

*Key words and phrases:* voice over guitar; voice control; talk box.

*Abstract:* The purpose of the study is to investigate the Voice Control OVER Guitar (VCOG) – system-controller guitar effects (or so-called presets) through the voice. In simple words, this is a feature that allows a guitarist with an electric guitar (through a headset microphone) to control his effects with his voice. In the classic version it worked (and is still used) by pressing the effects pedal (or floor effect processors). The study used general scientific research methods. Given the modern needs of live performances, when concert venues reach huge sizes and the ability to “run” and press the pedal does not seem convenient, VCOG comes to the rescue. Of course, in most cases, the sound technician can also switch “presets” with effects, however, this requires an accurate knowledge of the needs of the guitarist and the performer does not always follow certain patterns. In doing so, VCOG presents a unique solution for managing its audio.

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## **Intelligent Technologies and Performance Indicators for the Implementation of Automation of Information Support for Production Processes of Food Industry Enterprises**

*N.Yu. Logunova*  
*Russian Biotechnological University, Moscow*

*Key words and phrases:* automated information systems; Industry 4.0; intelligent technologies; information support; cyber-physical systems; food industry.

*Abstract:* The article discusses the main approaches to the problem of developing automation of information support for the production processes of food industry enterprises based on the concept of Industry 4.0 and intelligent manufacturing. The author's definition of the term "intelligent production" is given, the fundamental key performance indicators are identified, and the main integrated and qualitative models and methods for structuring and assessing the impact of key indicators on the effectiveness of implementing automation of information support for the production processes of food industry enterprises are considered.

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## **Digital Twin Framework for Industrial Process Maintenance**

*A.M. Nafikov, M.N. Davydkin*  
*National Research Technological University "MISiS", Moscow*

*Key words and phrases:* digital twin; cyber-physical systems; framework; predictive maintenance; manufacturing process; residual life.

*Abstract:* The article deals with the framework of digital twins for servicing industrial processes. The relevance of the concept of digital modeling of the behavior and performance of physical objects is well known. It is noted that advances in digitalization have created opportunities for extracting data, obtaining information and increasing situational awareness of the performance of a physical system. An analysis of the experience of using digital twins in industry has been carried out. Theoretical prerequisites for the formation of digital twins are given. The definition and use of a framework for the study of digital twins is given. The problems of using digital twins for servicing production processes are considered. The features of preventive maintenance using digital twins are presented. It is concluded that the ability to anticipate future maintenance needs in a timely manner is a prerequisite for reliable production, while regular and proactive scheduled maintenance increases the life and utilization of parts, leading to more sustainable production.

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## **Mathematical Model of Stabilization of the Speed of the Electric Motor Rotor Using the Runtime Simulation Environment Matlab Simulink**

*V.A. Stanovoy*  
*MIREA – Russian Technological University, Moscow*

*Key words and phrases:* numerical simulation; electric motor rotor; execution environment; model testing; control system.

*Abstract:* This study is devoted to the development of a mathematical model that reflects the specifics of the process of stabilizing the angular velocity of rotation of the rotor of an electric motor in the Matlab execution environment with a built-in graphical environment for modeling, analyzing and designing Simulink dynamic systems. The Euler method was applied to describe the motion dynamics of a rotary engine. The objective of this research is to develop a mathematical model for stabilizing the angular velocity of rotation of the rotor of an electric motor and its numerical simulation. The article provides an analytical description of the processes occurring in the system, including equations describing the direction of the speed of the rotor of the electric motor, and the procedure for calculating

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its speed for given values of the control parameters. A model of an electric motor with constant torques was chosen as the system under study. The inertial characteristics are self-defined, including the nature of the change and the set value of the angular velocity. When modeling the system, the friction moment was taken into account, as well as the controlled electromagnetic moment in accordance with the control law. As a result of the study, we obtained a graph of the set value of the angular velocity from time, which shows how the angular velocity changes in accordance with the control law, a graph of the angular position from time, which displays the change in the angle of rotation, a graph of the angular position from time, which displays changes in the angle of rotation of the rotor of the electric motor. The results of numerical simulation showed the correctness of the developed model and its applicability for solving practical problems in the field of controlling the stabilization of the angular velocity of rotation of the electric motor. The obtained results of the experiment showed the correctness of this assumption.

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### **Application Development Using Cloud Computing**

*A.A. Kharazyan*

*National Research University Higher School of Economics, Moscow*

*Key words and phrases:* software development; cloud services; PaaS; project; information security.

*Abstract:* The article deals with the development of applications using cloud computing. The relevance of cloud services for software development is substantiated. The advantages of developing applications using cloud computing are considered. Changes in the market volume of cloud services provided on the basis of the PaaS and IaaS models, benefits for developers of cloud services of the PaaS category are presented. The most popular software development solutions are presented. It is concluded that cloud tools are increasingly becoming a replacement for local development environments, which indicates not only their relevance, but also their high competitiveness.

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### **Development of Software for an Information System for Career Guidance Testing**

*I.V. Yanchenko, V.I. Kokova, M.A. Bureeva, O.A. Doronina*

*Khakass Technical Institute – Branch of Siberian Federal University, Abakan*

*Key words and phrases:* applicants; database; web application; interface; modeling; career guidance.

*Abstract:* The quality of training specialists at the university at all times largely depended on the effectiveness of the professional orientation of schoolchildren. The purpose of the study is to develop software for an information system (IS) of career guidance testing for the Khakass Technical Institute, a branch of Siberian Federal University with the possibility of online testing, storage of respondents' e-mail. During the implementation of the project, it is necessary to determine the architecture and development tools for the web application; design a database model; develop an IS. Methods of structural and object-oriented modeling, the theory of database normalization were used. The article presents the ER-diagram of the database; the main functionality and user interface of the developed web application; reporting module for specialists conducting analysis and statistics.

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### **Formation of the Numerical Code of the Fractal Structure of a Textured Optically Anisotropic Glastelite**

*P.P. Bakanov<sup>1</sup>, L.S. Izmailov<sup>2</sup>, N.A. Trigub<sup>2</sup>*

*<sup>1</sup> SENSTEK LAB LLC;*

*<sup>2</sup> National Research Technological University "MISiS", Moscow*

*Key words and phrases:* textured optical anisotropic material; fractal mask; multifractal structure;

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glastelite.

*Abstract:* The object of study in this work is a textured optical anisotropic material (TOAM) glastelite, which is characterized by a multilayer pattern on the background with tones similar in color without pronounced contrast. The top view projection for each instance of TOAM forms a graphic image of a fractal mask (FM) with clear boundaries of the multifractal structure, which in turn makes it possible to obtain a numerical characteristic from the fractal mask matrix. The purpose of this work is to calculate a numerical code from a fractal mask.

The study, within the framework of the hypothesis of the uniqueness of the formation of a numerical code for an individual instance of TOAM under various conditions for obtaining a photographic image, led to the formulation of tasks for the application of a sequence of numerical methods: a double Gaussian transform for blurring and smoothing chromaticity while maintaining the clarity of the fractal mask contours and approximation with an experimentally selected threshold for coarsening the fractal contours masks using the modified Ramer – Douglas – Pecker (RDP) algorithm.

The results obtained for leveling the ambiguity of the fractal mask for the same TOAM instance take into account: the difference in the color characteristics of the photo image, the change in spatial coordinates, and the non-identity of the rotation angles of the photo image of the TOAM instance. In the course of the work, results were obtained that make it possible to use the developed approach to automate the processing of TOAM photographic images obtained under various conditions in order to establish the correspondence of an identical numerical code to a graphic image of a fractal mask of an individual TOAM instance.

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### **Calculation Algorithms and Prototypes of Impact-Absorbing Structures Based on Toroidal Thin-Walled Shells**

*V.V. Bogdanov<sup>1, 2</sup>, D.T. Bautdinov<sup>2</sup>, I.S. Chabunin<sup>1</sup>*

*<sup>1</sup> Moscow Higher Combined Arms Command Orders of Zhukov, Lenin and the October Revolution Red Banner School, Moscow;*

*<sup>2</sup> State University of Management, Moscow*

*Key words and phrases:* thin-walled shells; crashboxes; damping; shock-absorbing devices; vehicles; calculation algorithms; high-performance computing.

*Abstract:* The article describes an approach to the creation of shock-absorbing devices based on thin-walled shells of toroidal shapes close to the catenoid in order to ensure safety in case of potential impact. The task was set to create a prototype of a composite thin-walled shell structure capable of minimizing the consequences of an impact to the maximum extent possible in comparison with existing analogues. The theoretical calculations carried out by the finite element method made it possible to propose a number of effective damping devices, for which the authors obtained RF patents for utility models.

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### **Structural Analysis of Programming Languages for Secure Applications for Programmable Logic Controllers**

*Yu.S. Buzykova<sup>1</sup>, A.S. Zufarova<sup>2</sup>*

*<sup>1</sup> MIREA – Russian Technological University, Moscow;*

*<sup>2</sup> Pacific State University, Khabarovsk*

*Key words and phrases:* logic controllers; programming; research; analysis.

*Abstract:* The purpose of the study is that programmable logic controllers (PLCs) are used mainly in the field of industrial automation for the development of complex control systems. The design of these applications has a big impact in terms of performance and manufacturing costs. Due to the complexity of control systems and the reuse of combinations of software and hardware, the designer must pay special

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attention to the security of these systems. The research hypothesis is that one of the ways to ensure the security of PLC applications and improve their quality is to use programming languages of the IEC 61131-3 standard, which makes it possible to develop modular applications that are independent of the PLC manufacturer. The work used general scientific research methods. The novelty of the study is the IEC 61131-3 standard defines the syntax and semantics of four programming languages for PLCs, as well as an auxiliary tool for structuring programs (diagram type language SFC).

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### **Visual Programming Language Translator for Petri-Object Models**

*Yu.S. Buzykova<sup>1</sup>, A.S. Zufarova<sup>2</sup>*

<sup>1</sup> *MIREA – Russian Technological University, Moscow;*

<sup>2</sup> *Pacific State University, Khabarovsk*

*Key words and phrases:* Petri-models; programming; teaching; ML.

*Abstract:* The purpose of the study is to explore visual programming as a direction in the development of software tools aimed at the use of visual objects to describe the task of performing calculations. In order for a visual representation to become visual programming, it is necessary to guarantee an unambiguous transformation of a visual representation into calculations. The research hypothesis is that such a transformation is provided by a speech translator. The study used general scientific research methods. The novelty of the study is that Petri nets are a key formalism for modeling discrete-event systems, which covers a wide class of systems from automata to stochastic. In the context of software engineering, the formalism of Petri nets is also described as important because it is generally accepted for the development of parallel and distributed computing in accordance with the ISO/IEC 15909-1:2004 standard.

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### **Applications and Generalizations to the Derivation of the Hamilton-Jacobi Equation**

*V.V. Petrova<sup>1</sup>, I.V. Zaitseva<sup>1</sup>, A.A. Filimonov<sup>2</sup>, O.I. Skvortsova<sup>3</sup>, V.V. Bondar<sup>3</sup>*

<sup>1</sup> *Russian State Hydrometeorological University, St. Petersburg;*

<sup>2</sup> *Stavropol Branch of Krasnodar University of the Ministry of Internal Affairs  
of the Russian Federation, Stavropol;*

<sup>3</sup> *North Caucasian Federal University, Stavropol*

*Key words and phrases:* Hamilton-Jacobi equation; Hamilton function; action; Cartesian coordinates; curvilinear coordinates.

*Abstract:* The article is devoted to a new approach to the derivation of the Hamilton-Jacobi equation using vector algebra, its geometric and physical meaning is illustrated, as well as its application in quantum mechanics. The solution of this equation in various coordinate systems is considered. The aim of the work was a new look at the theory of Hamilton - Jacobi, linking together vector analysis, theoretical mechanics and quantum mechanics. A new derivation of the Hamilton-Jacobi equation is proposed, it is shown how, with the help of simple operations, the same equation can be used to solve problems of quantum mechanics. Examples of solving the equation in Cartesian and polar coordinates with the help of additive separation of variables are given.

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### **Undirected Prefractal Graphs. A Compact Task**

*A.A. Erkenova, A.A. Uzdénov*

*North Caucasian State Academy, Cherkessk*

*Key words and phrases:* strongly connected prefractal graph; seed; undirected graph; hanging

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vertices; direct chain covering the set of a prefractal graph.

*Abstract:* The use of information technologies in science and technology poses new challenges, which demonstrate the possibilities of the language and methods of the theory of prefractal graphs not only in mathematics, but also in economics and electrical engineering. The aim of the paper is to find exact upper bounds for the cardinality of the set of vertices of a strongly connected prefractal graph. An important problem in the theory of prefractal graphs is the problem of compactly specifying the set of vertices of a strongly connected prefractal graph.

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### **Improving the Use of Gas Fuel in the Processes of Heat Treatment of Building Materials**

*V.B. Birulya*

*St. Petersburg State University of Architecture and Civil Engineering, St. Petersburg*

*Key words and phrases:* firing; energy consumption norms; building materials; energy efficiency; energy saving.

*Abstract:* The purpose of the study is to substantiate optimal energy-saving technologies that improve product quality and reduce environmental pollution when using fuel in tunnel kilns. The research methods adopted theoretical and experimental searches for ways to reduce fuel consumption for drying and firing of wall ceramics. As a result of the research, optimized schemes for the use of gas fuel by drying plants and a furnace were obtained.

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### **Calculation of Infiltration in the Organization of Supply and Exhaust Mechanical Ventilation inside the Building**

*K.P. Zubarev<sup>1, 2, 3</sup>, M.R. Timofeeva<sup>1</sup>*

<sup>1</sup> *National Research Moscow State University of Civil Engineering, Moscow;*

<sup>2</sup> *Research Institute of Building Physics of the Russian Academy of Architecture and Building Sciences, Moscow;*

<sup>3</sup> *Peoples' Friendship University of Russia, Moscow*

*Key words and phrases:* mechanical supply and exhaust ventilation system; calculation of infiltration heat losses.

*Abstract:* The article discusses the calculation of infiltration heat losses for a residential building equipped with a mechanical supply and exhaust ventilation system. The purpose of the article was to study the issues of infiltration of buildings with a mechanical ventilation system. The objectives of the article include the calculation of infiltration heat losses for an apartment with a mechanical supply and exhaust ventilation system. Calculated infiltration heat loss for a residential apartment. It is shown that the load on the heating system when organizing a supply and exhaust ventilation system is lower than when organizing a natural ventilation system.

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### **Improving the Performance of Road Surfaces with the Addition of Asphalt Granulate**

*Sh.V. Buzikov, M.V. Motovilova*

*Vyatka State University, Kirov*

*Key words and phrases:* road surface; asphalt granulate; water resistance; deformation characteristics; density; strength; aging.

*Abstract:* The article considers the issue of destruction of the upper layer of the roadway during its intensive operation from cyclically repeated dynamic loads from the wheels of a vehicle. Performance

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indicators are presented as strength and deformation characteristics. The purpose of the study is to improve the performance of the road surface, taking into account the use of asphalt granulate in the formation of the mixture. The research objectives are analysis of the main indicators affecting the road surface; identification of the relationship when the surfaces of the crushed asphalt granulate come into contact with the binder; determination of the fractional size of asphalt granulate for the formation of specified performance properties. The research hypothesis assumes the formation of a road surface with specified strength and deformation parameters when adding asphalt granulate, which leads to the required service life, as well as traffic safety. The study uses research and applied methods (analysis, comparison, systematic approach, generalization). The possibility of forming asphalt concrete with the use of crushed granulate of two standard sizes by controlling the properties and structure of the road surface is proposed. As a result of the study, the dependence of the strength of the dispersed system on the fractional size of the asphalt granulate was determined. The use of granulate in a ratio of 25–30 % and 70–75 % in terms of granulometric index improves shear resistance, strength properties, increases binder adhesion and water resistance.

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### **Active BIM to Optimize the Layout of Storage Yards and Tower Cranes**

*T.Yu. Poznakhirko, S.N. Bunyakin*

*National Research Moscow State University of Civil Engineering, Moscow*

*Key words and phrases:* active BIM; optimization; positioning; time cycle; tower crane.

*Abstract:* The purpose of the article is to analyze the methods for choosing the optimal organizational and technological solution for the location of warehouses and the selection of a crane using computer design. The approach of active building information modeling for working facilities and the optimal placement of tower cranes on construction sites with repetitive operations is presented. This article presents an active BIM approach for optimal simultaneous positioning of a tower crane and objects needed to support repetitive work on a construction site. The output results obtained using the proposed model include the optimal coordinates of the position of the tower crane, as well as the optimal places and areas for storing material.

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### **Increased degree of Responsibility in the Production of Judicial Construction and Technical Expertise of High-Rise Buildings**

*G.B. Safaryan, Yu.E. Malafeeva*

*National Research Moscow State University of Civil Engineering, Moscow*

*Key words and phrases:* forensic construction and technical expertise; forensic situation; expert; high-rise buildings; construction stages; responsibility; expert's subscription.

*Abstract:* The emergence of forensic situations in the field of high-rise housing construction is directly related to the increase in the pace of construction of high-rise buildings. The procedure for conducting a forensic construction and technical expertise does not provide for an exact gradation by type of construction, which necessitates the development of separate research methods specific to each type of building. The analysis of legislative aspects was carried out when giving an expert's signature on a warning of criminal liability, as well as legislative and real manifestations of the consequences of violation of these laws. The subject of the study is the characteristic features of high-rise buildings and the analysis of possible forensic situations that arise around high-rise housing construction at the stage of design, construction and operation. The study is aimed at identifying the stages of construction of high-rise buildings, where there is an increased responsibility for the production of judicial construction and technical expertise. The purpose of the study is to establish the need to introduce an increased degree of responsibility in the production of judicial construction and technical expertise of high-rise buildings.

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Materials and methods. A review of studies and real court cases aimed at identifying the characteristic features of high-rise buildings at the stages of design, construction and operation has been carried out.

Results. The necessity of introducing an increased degree of responsibility in the production of judicial construction and technical expertise of high-rise buildings has been established. Further in-depth research is needed, using specific examples of forensic examinations in the field of high-rise buildings, to identify statistics of problems that arise during the production of these examinations.

Conclusions. To date, there is no such thing as “degree of responsibility of an expert”. The necessity of introducing a scale for assessing responsibility in the production of judicial construction and technical expertise of high-rise buildings has been established.

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### **Automation of the Process of Preparation of Working Documentation for the Section “Reinforced Concrete Structures” Using Visual Programming Tools in Revit Autodesk Software**

*K.O. Shlykov, N.I. Fomin, I.K. Kalandadze, D.V. Nikagosov*

*Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg*

*Key words and phrases:* Dynamo; specifications; script; working documentation; visual programming.

*Abstract:* The purpose of this article is to study the possibility of automating the process of preparing working documentation for the section “Reinforced concrete structures” using the example of a set of working drawings of vertical load-bearing structures, based on the hypothesis that automation of routine processes can increase the speed of documentation. The initial data was a model with a number of parameters filled in, as well as specifications necessary for placement on sheets. In the course of the study, using the modeling and analysis method, a script was created using the Dynamo visual programming tools for batch copying of specifications with the substitution of parameters, as well as sheets of the corresponding brands of vertical load-bearing structures. According to the results of the study, it was found that the use of this automation tool makes it possible to speed up the operations for creating and placing sheets and specifications by 70 %.

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### **Dispute on the Establishment of the Land Boundaries**

*N.V. Belmach, N.P. Kuzmich*

*Far Eastern State Agrarian University, Blagoveshchensk*

*Key words and phrases:* state cadastral registration; land disputes; land plots; land management expertise; cadastral engineer; border crossings of land plots; registry error.

*Abstract:* The article deals with registry errors in the Unified State Register of Real Estate (EGRN), which appear as a result of crossing the borders of adjacent land plots located on lands for farming. The objects of study are land plots, their boundaries and location, as well as buildings and structures located on them. The purpose of the article is to investigate the features of the land dispute in connection with the identified registry error. The objectives of the study are to consider a registry error on a specific example of crossing the boundaries of land plots previously recorded in the USRN, to identify and eliminate it. The hypothesis of the study is that the presence of registry errors indicates the existence of a serious problem, expressed in the absence of up-to-date information about some real estate objects in the USRN. As a result of the study, it was concluded that the accumulation of registry errors adversely affects the reliability of the entire USRN maintenance system. Methods of observation, measurement, comparison, analysis and generalization of data were used.

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## **Modeling Construction Schedules: Applying the Laws of Distribution of Random Variables**

*D.N. Ivanov, T.A. Fedoseeva  
National Research Moscow State University of Civil Engineering, Moscow*

*Key words and phrases:* scheduling; normal distribution law; lognormal distribution law; random variable; construction.

*Abstract:* The purpose of the study is to substantiate the choice of the most rational application of the laws of distribution of random variables in the formation of the construction schedule. To achieve this goal, the task is to identify the features of modeling scheduling in construction on the basis of log-normal and normal distribution laws of random variables. The working hypothesis is the assumption of the possibility of using the log-normal distribution law, which allows taking into account various factors that affect the duration of the work, in order to improve the accuracy of modeling. As a result of the study, recommendations were formulated for choosing the law of distribution of random variables, depending on the task facing the simulation of the construction schedule.

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## **Rationale for the Development of a Service to Ensure the Inventive Activity of University Students**

*N.I. Fomin, D.A., Letavin L.I. Mironova  
Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg*

*Key words and phrases:* protection of technical solutions; patent application; engineering creativity; inventive activity; process automation service.

*Abstract:* The relevance of the topic of the article is due to the need to intensify innovation activities at domestic industrial enterprises to ensure accelerated technological sovereignty. The research hypothesis is that the development of the service will reduce the gap between the level of methodological support of a university student in the field of engineering creativity (including inventive activity) and the needs of modern industrial enterprises focused on innovative development. The purpose of the article is to substantiate the need to develop a service to ensure inventive activity at the university, which makes it possible to automate the process of generating a patent application. To achieve the goal, the following tasks were completed in the article: an analysis of the work on the methodological support of industry invention and patenting in the university environment; the analysis of existing foreign software tools for the formation and verification of patent applications was carried out. The analysis showed the feasibility of developing a domestic university service to automate the process of generating a patent application, while it must take into account industry specifics when forming the elements of the application. The results of the study are as follows: the presented justification will allow university teams of service developers to proceed to the next stage: designing its structure based on the algorithm for generating an inventive solution and filing an application for a patent for it.

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## **On the Problem of Implementing the Activity Approach in the System of Higher Pedagogical Education**

*G.A. Bauder, L.I. Polunina  
Michurinsk State Agrarian University, Michurinsk*

*Key words and phrases:* system of higher pedagogical education; activity approach; methodological basis; federal state educational standard.

*Abstract:* The aim of the study is to determine the features of the implementation of the activity approach in the system of higher pedagogical education. The article presents the results of a



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study of the comparative pedagogical nature of the features of the implementation of the activity approach in the system of higher pedagogical education. The approach under study is considered as a key methodological foundation of the modern educational paradigm. The article proves that the activity approach is focused on educational results, legally reflected in the federal state educational standards. Within the framework of this study, the effectiveness of the activity approach is affirmed as a methodological basis for the organization and functioning of the system of training teachers in the system of higher education. The study used methods characteristic of comparative pedagogy: comparative, descriptive, inductive-deductive.

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### **Features of Self-Determination of Specialists in the Process of Professional Training in Modern Conditions**

*T.A. Dronova, A.A. Dronov  
Voronezh State University, Voronezh;  
Air Force Academy named after prof. NOT. Zhukovsky and Yu.A. Gagarin, Voronezh*

*Key words and phrases:* self-determination; 21<sup>st</sup> century; information acceleration.

*Abstract:* The purpose of the presented study is to solve the problem of self-determination of specialists in modern conditions. The task of the study: to identify the features of the 21<sup>st</sup> century. The research hypothesis is the assumption that the constructiveness of self-determination of specialists will depend on the process of interaction with the modern information flow. Results: the study makes a certain contribution to the formation of the capabilities of specialists in modern conditions.

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### **Teaching Interior Design Visualization Students Taking into Account the Basics of Personality Psychology**

*I.I. Zaitseva, A.S. Shakhova, A.R. Butko, E.R. Krylova  
Lipetsk State Pedagogical P. Semenov-Tyan-Shansky University, Lipetsk*

*Key words and phrases:* interior design; living quarters; human psychology; learning process; space; psychological perception; comfort.

*Abstract:* The purpose of this article is to study the issue of teaching students in the design and design of interior design from the point of view of personality psychology as a necessary process for the effective organization of creating a comfortable internal environment of a living space. The objectives of the article are as follows: after analyzing the factors influencing the psycho-emotional state of a person in a living space, to identify the sequence of work on an interior design project. The research hypothesis is the assumption that studying and taking into account the basics of the psychology of the customer's personality will help make the process of developing the interior design of a dwelling more productive. As a result of the study, it was revealed that it is necessary, when creating a design project in working with a client, to take into account the nature and specifics of a person's psychological perception of the surrounding living space, taking into account the basics of personality psychology.

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### **The Use of the Project Method in the Study of the Life and Work of A.E. Kulakovskiy (Eksekyulyakh)**

*G.A. Zakharova, A.N. Atlasova  
North-Eastern Federal University named after M.K. Ammosov, Yakutsk*

*Key words and phrases:* project; methodology; methods and techniques for studying literature; educational process; Yakut literature.

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*Abstract:* This article proposes an attempt at a detailed study of the life and work of the writer using the design method. To do this, we have proposed a model of students' project activities through the active use of the research method in the study of the works of A.E. Kulakovsky "The Shaman's Dream" and "Letter to the Intelligentsia". The purpose of the article is to theoretically substantiate the method of project activity in the study of a work of art in high school, to determine its specifics, to conduct an experimental verification of this technique. Based on this, the following tasks were put forward: to identify the most effective techniques and methods for studying the works of A.E. Kulakovsky in the 10th grade, necessary for a modern teacher. The hypothesis is as follows: if the methods and techniques of project activities are used to study the works of art by A.E. Kulakovsky, this approach will ensure the quality of its development, the development of skills for a holistic perception of a work of art, will allow to consolidate knowledge of theoretical and literary concepts, which will create the prerequisites for increasing the cultural and spiritual and moral potential of students. The research methods are comparative analysis of the content of Yakut literature textbooks and organizational and pedagogical conditions. The results are as follows: the conclusions, materials and methodological index of the study can find practical application in teaching Yakut literature and can be used in the classroom to enhance students' interest in their native literature.

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### **Using the Stellarium Program in Astronomy Lessons**

*S.P. Zlobina, A.M. Mezhina, E.A. Kopteeva*  
*Shadrinsk State Pedagogical University, Shadrinsk*

*Key words and phrases:* astronomy; methods of teaching astronomy; computer technologies; Stellarium program.

*Abstract:* The purpose of our study is to show the importance and necessity of using information technology in astronomy lessons. We were faced with the following tasks: to prove the need to use the Stellarium program when studying astronomy at school; give specific examples of the use of this program in astronomy lessons. We put forward a hypothesis: if computer technologies are used in the process of teaching astronomy, students will increase their cognitive interest in the subject, a scientific worldview, a natural-scientific picture of the world, and independent activity will be formed. In the article, we have given four fragments of an astronomy lesson in which it is advisable to use the Stellarium program. As a result of this study of astronomy, students can observe events occurring in space in real time.

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### **Fairy Tale Therapy as a Means of Forming the Speech of Preschoolers**

*E.V. Kirpicheva, E.V. Korepanova*  
*Michurinsk State Agrarian University, Michurinsk*

*Key words and phrases:* harmonization; communication; speech development; speech of preschoolers; self-regulation; fairy tale therapy.

*Abstract:* The purpose of the study is to present the possibilities of forming the speech skills of preschoolers with developmental disabilities through the achievement of intense emotional resonance caused by the texts of fairy tales. The task of the work is seen in proving the special possibilities that the images of fairy tales provide in communication, referring to two mental levels at once: consciousness and subconsciousness. The hypothesis put forward lies in the position that if you choose the right fairy tale, then you can correctly determine the speech problem of a preschooler by defining a complete list of speech problems through a fairy tale and outlining figurative ways to solve them. The leading research method is observation and recording of the results obtained in the process of using integrative fairy tale therapy. As the results achieved, it is noted the possibility of creating individual developmental, psychocorrective and psychotherapeutic programs for the development of speech of preschoolers on the basis of fairy tale therapy, using different forms of presentation of the material.

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## **The Comparative Analysis of the Level of Technical Training of Young Female Basketball Players in Competitive Activities**

*S.V. Kornev*

*Petrozavodsk State University, Petrozavodsk*

*Key words and phrases:* basketball; statistics; coach; summer sports camp; sports school of the Olympic reserve; Kupchinsky "Olimp".

*Abstract:* In this paper, a comparative analysis of the technical training of basketball players of the sports school of the Olympic reserve Kupchinsky "Olimp" in St. Petersburg (hereinafter referred to as Olympus) of the group of the training stage (the stage of sports specialization, girls born in 2009) was carried out. The purpose of the study is to compare the statistical indicators of players in terms of technical readiness in competitive activities, to determine the effectiveness of the training process in the summer sports camp (hereinafter referred to as the Camp) in the off-season. The following tasks are set in the study: to analyze the scientific and methodological literature and determine the basic requirements for the technical training of basketball players; to determine and compare the level of technical training in two official matches in different seasons of the players of the Olympus team with one of the strongest rivals – the team of the central sports club of the army (CSKA). To complete the tasks set, the following methods were used: analysis, testing, generalization of literature. The research hypothesis is the assumption that a comparative analysis of the technical training of young basketball players will determine the effectiveness of the training process in the Camp for the technical training of players and will make the necessary adjustments to improve it. The results of the study proved the role and importance of conducting a statistical analysis of players in competitive activities. They showed the importance of holding training camps to improve the level of technical, physical and emotional training of young basketball players.

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## **The Value of Physical Culture and Sports in the Life of a Modern Student**

*S.V. Kornev*

*Petrozavodsk State University, Petrozavodsk*

*Key words and phrases:* physical culture; sports; students; healthy lifestyle; questioning.

*Abstract:* This article analyzes the attitude of students of Petrozavodsk State University (Institute of Pedagogy and Psychology) to physical education and sports. The purpose of the study is to determine the role of sports and physical culture in their lives in the past, present and future. Find out how, according to students, it is possible to popularize sports and physical culture among young people. The main research methods are theoretical analysis and generalization of scientific and methodological literature, questioning. The results of the study allow us to conclude that for the majority of the students surveyed, sport is a healthy and active lifestyle, hard work, a way of self-development and self-discipline. At the same time, thinking about the future, students are not sure whether they will go in for sports after graduation, but they give recommendations that may affect their positive attitude towards physical education and sports.

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## **Didactic Potential of Internet Memes in German Lessons**

*L.N. Kuznetsova, E.A. Eremina, S.V. Bespalova*

*National Research Mordovia State University, Saransk*

*Key words and phrases:* learning; Internet meme; classification; competence; technique; exercise; reading; German.

*Abstract:* The purpose of this article is to reveal the didactic potential of Internet memes in a foreign

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language lesson in high school. To achieve this goal, the following tasks were solved: the scope of the Internet meme concept was clarified, its types and classification were analyzed, and the main methods of working with German-language Internet memes were described. The hypothesis of the study is the following assumption: an Internet meme not only increases the motivation and interest of students in learning a foreign language, but also helps to effectively form lexical and grammatical skills, replenish background knowledge about the culture of the country of the language being studied. The results of the study are methodological recommendations and exercises developed by the authors using Internet memes in German lessons.

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### **Current Situation and Strategy for Cultivating Foreign Propaganda Translation Skills in English Language Students in Higher Education Institutions in the Context of “One Belt, One Road”**

*Liu Likun*  
*Heihe University, Heihe (China)*

*Key words and phrases:* One Belt, One Road initiative; intercultural communication; translation.

*Abstract:* The government is constantly deepening trade and economic cooperation and cultural exchanges, thus the translation of foreign propaganda begins to play an important role. External propaganda is China's use of foreign languages to present all its activities to the world. Following the ever-increasing actual demand for modernization and internationalization in China, external promotion activities in English are consciously carried out by the Chinese government and the media, as well as unknowingly by other people who use English in business, tourism and teaching. The purpose of this article is to strengthen the cultivation of intercultural awareness when translating external propaganda into teaching English and to find effective ways to successfully implement intercultural communication. The task is to develop the skills of translating foreign propaganda among students majoring in English in higher education institutions, which is to develop students' English language skills; increase students' cultural awareness; create a new teaching methodology; change the criteria for evaluating teaching.

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### **Features of the Formation of Social Activity of Adolescents in the Educational Process**

*T.K. Mukhina*  
*Vladimir State University named after Alexander and Nikolay Stoletovs, Vladimir*

*Key words and phrases:* socialization; social activity; formation of social activity.

*Abstract:* The study aims to characterize the features of the formation of social activity of adolescents; tasks: to determine the model of a socially active person and methods of its formation. The hypothesis is the assumption that the formation of social activity will be effective in the implementation of the technology of cooperation and the development of communicative, organizational and leadership qualities of students. The methods of theoretical analysis, comparison and generalization were used. As a result of the work, the principles, approaches and methods of forming the social activity of adolescents are determined.

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### **An Activity Approach as the Basis for the Formation of the Personality of a Future Teacher**

*L.I. Polunina, G.A. Boudier*  
*Michurinsk State Agrarian University, Michurinsk*

*Key words and phrases:* system of higher pedagogical education; activity approach; methodological basis; federal state educational standard.

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*Abstract:* The aim of the paper is to study the activity approach as the methodological basis of the modern educational paradigm. The article deals with the issues of comparative pedagogical nature of the possibility of functioning of the activity approach in the system of higher pedagogical education. A comprehensive description of the structural and content features of the activity approach in the system of higher pedagogical education is carried out on the basis of an analysis of the work of foreign and domestic researchers. In the course of the work, comparative, descriptive and inductive-deductive research methods were used.

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### **Computer Technologies as a Means of Differentiation and Individualization of the Educational Process**

*N.A. Sablina, I.M. Eliseeva, A.Kh. Akhmerova, M.A. Polkovnikova  
Lipetsk State Pedagogical P. Semenov-Tyan-Shansky University, Lipetsk*

*Key words and phrases:* computer technologies; educational process; differentiation; individualization.

*Abstract:* The aim of the study is to analyze the effectiveness of the use of computer technologies as a means of differentiation and individualization of the educational process. The main task is to identify and theoretically substantiate methods and technologies that contribute to the differentiation and individualization of the educational process. The hypothesis is based on the need to identify conditions and methods based on computer technology for organizing the educational process in the current conditions of the development of society. The results achieved emphasize the importance of the chosen methods and conditions for the differentiation and individualization of the educational process.

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### **Socio-Pedagogical Aspect of Cybercrime Prevention among Teenagers**

*K.V. Skvortsov, A.R. Patrikeyeva, R.Sh. Garifulin A.B. Luchter  
Vladimir Law Institute of the Federal Penitentiary Service of Russia, Vladimir;  
Kuzbass Institute of the Federal Penitentiary Service of Russia, Novokuznetsk;  
Vladimir State University named after Alexander and Nikolay Stoletovs, Vladimir*

*Key words and phrases:* global network; Internet; cybercrimes; teenagers; information technologies; prevention.

*Abstract:* In the light of the need for preventive measures in the framework of combating cybercrime and ensuring cybersecurity, the article focuses on the need to improve approaches to education and develop a special component in the professional activities of subjects of education and upbringing. The purpose of the study is to reveal the features of the prevention of cybercrimes among adolescents and to propose specific measures to prevent this group of crimes. The objective of the study is to reveal approaches to eliminating the negative impact of the global Internet on adolescents, with their subsequent involvement in antisocial and antisocial groups. The hypothesis is as follows: juvenile delinquency directly depends on social conditions and conditions of upbringing in the family. The commission of cybercrime among teenagers is preceded by ignorance of the rules of use and behavior in the global network. The following methods were used in the study: theoretical analysis of the problem based on the study of business media information sources, analysis of statistical data, observation, comparison and synthesis. Results: socio-pedagogical measures to prevent cybercrime among adolescents are proposed.

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## **Continuous Self-Education Technology as a Factor in Improving the Quality of Students' Training in a General Education School**

*S.S. Tanisheva, R.A. Alimov, V.A. Kurinnoy*

*Crimean Engineering and Pedagogical University named after Fevzi Yakubov, Simferopol*

*Key words and phrases:* lifelong self-education; general education school; self-education; technology; learning technology.

*Abstract:* The purpose of this article is to study and analyze the technology of continuous self-education as a factor in improving the quality of training of students in a general education school. To achieve the goal, the following tasks were set: studying the technology of continuous self-education, as well as assessing the impact of continuous self-education technology on the quality of training of students. The hypothesis of the study is the use of continuous self-education technology in a general education school, which has a positive effect on improving the quality of student training. In the field of education, one can find results indicating the positive impact of continuous self-education technology on the quality of student training. These outcomes may include improved academic achievement, increased student motivation and self-efficacy, and development of self-organization, critical thinking, and self-directed learning skills.

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## **Works of Fine Art as a Means of Forming the Moral Feelings of Children of Senior Preschool Age**

*Liu Jun*

*South Ural State Humanitarian Pedagogical University, Chelyabinsk*

*Key words and phrases:* art criticism story; morality; morality; moral education; moral feelings; works of art.

*Abstract:* The purpose of the study is to select works of fine art and analyze their use as a means of forming the moral feelings of children of senior preschool age. Scientific, methodological publications on the topic, as well as own developments in this direction, were taken as material for the study. In the article, a comparative historical method was used, which made it possible to see the chronology of the development of the concept of "moral feeling", to identify certain patterns in the development of this concept. The method of analysis of psychological, pedagogical and methodological literature was used to determine the scientific foundations of the study, study and generalization of innovative experience in the formation of moral feelings of older preschool children. In the process of working on the topic, a game method was used to study the creativity of children with the help of fine arts. Also, when getting acquainted with works of fine art, in order to form moral feelings, a tactile-sensual method was used, the main purpose of which is to evoke an emotional-sensory response of the child. All this allowed us to identify effective means of forming moral feelings, in particular, works of fine art.

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## **Food Addiction among Young People**

*E.V. Shalomova*

*Vladimir State University named after Alexander and Nikolay Stoletovs, Vladimir*

*Key words and phrases:* food addiction; student youth; overeating; physical and mental health; self-esteem.

*Abstract:* In the article, the author considers the problem of the characteristics of food addiction among young people, related to non-chemical addictions. The purpose of the article is to draw attention to the causal relationship between the mental well-being of a young person and food intake. The tasks are to analyze the tendency of young people to food addiction and the reasons leading to this addiction, to argue the ways, technologies and ways of preventing food addictions. The study used the methods



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of observation, questioning, survey, conversation, comparison, analysis, synthesis, and generalization. The hypothesis is that the success and effectiveness of the prevention of food addiction depends on the formation of a constructive life position in a young person, the development of social maturity, a pro-social life strategy, and the building of a healthy psychological environment in his environment.

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### **Pedagogical Conditions for the Interaction of the Class Teacher with the Subjects of the Educational Process in the Era of Digital Transformation of Education**

*E.V. Bystritskaya, O.A. Katushenko*  
*Moscow State University of Sport and Tourism, Moscow;*  
*Minin Nizhny Novgorod State Pedagogical University, Nizhny Novgorod*

*Key words and phrases:* cyberspace; pedagogical conditions; education; class teacher; participants in the educational process.

*Abstract:* Currently, the features of the interaction of the class teacher with the subjects of the educational process, which is carried out in the era of digital transformation, are being considered. The purpose of the study is to determine the pedagogical conditions for the interaction of a class teacher with other subjects of the educational process in cyberspace, which is formed in the process of digital transformation of the education sector. As research methods, the authors used formal logic, inductive-deductive analysis, study and generalization of the experience of training future teachers. The result of the study is the identification of the features of the three levels of pedagogical conditions in terms of the fulfillment of the educational function by the class teacher in cyberspace with the subjects of the educational process.

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### **The Study of the Ideas of Students of a Pedagogical University about Research Activities**

*M.N. Vishnevskaya, E.A. Andreeva, E.V. Gunina*  
*Chuvash State Pedagogical University named after I.Ya. Yakovlev, Cheboksary*

*Key words and phrases:* research activity; research work of students; teaching and research work; students.

*Abstract:* The authors of the article presented the results of a study aimed at studying the ideas of students of a pedagogical university about research activities. The purpose of the study is to reveal students' knowledge about research activities, their attitude towards it. The study was based on the hypothesis, according to which it is assumed that the manifestation of students' activity in research work depends on their awareness in this area. It was revealed that there is interest in research work, but only 37.1 % of students participate in this type of work. Lack of time (71.2 %) is cited as the main reason for not doing research work. The following research methods were used: source analysis, survey, quantitative and qualitative analysis.

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### **Interpreting Skills in Russian**

*Gao Han*  
*Heihe University, Heihe (China)*

*Key words and phrases:* Russian language; oral translation; training of high quality translators.

*Abstract:* The purpose of this article is that the cooperation between China and Russia against the backdrop of turbulence in international events and the rapid development of China's strategic initiative "One Belt, One Road" attracts the attention of the whole world. In this regard, there is a growing need for Russian-speaking translators and gaps in their training. Interpreting is the main part of translation work. For modern education, the preparation of high-quality translators is very important, which consists

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not only in obtaining a set of theoretical knowledge, but also in the practical application of the skills and abilities of interpreting. This article examines the experience and development of Russian interpreting. The combination of theory and practice is the main method of this article.

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### **Theoretical Aspects of Officers' Retraining for the Implementation of Pedagogical Activities in Military Universities**

*N.A. Dedik, S.Yu. Sakharov*

*Air Force Academy named after Professor N.E. Zhukovsky and Yu.A. Gagarin, Voronezh*

*Key words and phrases:* military universities; officers; pedagogical activity; retraining; pedagogical abilities.

*Abstract:* The article analyzes the actual problem of retraining officers for the implementation of pedagogical activities in military universities, and also identifies the contradictions that determine it. The purpose of the study is to identify the essence and specifics of the professional retraining of officers, to reveal the potential of the educational process in the formation of the pedagogical abilities of future teachers. The task of the study is to reveal the specifics of the professional retraining of officers for pedagogical activity using an individual educational trajectory. The following methods were used in the course of the study: theoretical – comparative analysis, synthesis, generalization and interpretation of scientific data, forecasting; empirical – observation, survey, testing, expert assessments.

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### **Features of the Organization of Activities of Employees of the Penitentiary System with Convicts with Experience in the Use of Narcotic Substances**

*P.N. Kazberov*

*Research Institute of the Federal Penitentiary Service, Moscow*

*Key words and phrases:* penitentiary system; employees; convicts; dependence on psychoactive substances; program; motivational counseling; guidelines; program.

*Abstract:* The purpose of the article is to analyze the main aspects of the training of employees of the Federal Penitentiary Service of Russia, including employees of the psychological service, in the development of drug addicted convicts' motivation for treatment and internality in relation to addiction. In accordance with the goal, the tasks are set: disclosure of the problems of working with drug-addicted convicts, identification of factors that contribute to the development of internality among convicts in relation to their addiction; determination of the main organizational and methodological tools for the implementation of the researched activities by employees; disclosure of factors that ensure the effective use by employees of methods to motivate drug addicted convicts for treatment. The study used methods: observation, survey, as well as analysis of the available organizational, scientific and methodological literature on the issue under consideration. As a result of the study, the list of methods used by the employees of the Federal Penitentiary Service of Russia in organizing work with drug addicted convicts was analyzed.

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### **Description of the Process of Preparing Cadets of Military Institutions to Perform Tasks Taking into Account Modern Information Threats**

*A.M. Kazimirovich*

*St. Petersburg Military Order of Zhukov Institute of the National Guard Troops of the Russian Federation, St. Petersburg*

*Key words and phrases:* information security; provocative information; professional training; information security threats.

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*Abstract:* The article reveals the relevance in the preparation of cadets for the successful completion of tasks assigned to them in the face of information threats. The purpose of the article is to describe the process of preparing cadets of military institutions to perform tasks, taking into account modern information threats. The hypothesis of the study is that the successful fulfillment of the tasks assigned to the cadets in the conditions of information threats will be ensured if the result of the cumulative positive influence on the cadet at any time is significantly higher than the cumulative influence (pressure) caused by the information impact from the destructive forces. As a result of the study, circumstances were identified that significantly affect the magnitude of the cumulative positive impact and destructive impact. The necessity of finding and justifying effective developments that can significantly improve the quality of ongoing measures to develop resistance to the impact of provocative information in the process of professional training is substantiated.

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### **Counteracting the Disorganization of the Activities of Institutions that Ensure Isolation from Society**

*E.V. Kashkina*

*Research Institute of the Federal Penitentiary Service, Moscow*

*Key words and phrases:* penitentiary system; convicts; disorganization of activities; isolation from society.

*Abstract:* The study aims to investigate the theoretical and practical problems of criminal liability for the disorganization of the activities of institutions that ensure isolation from society. To achieve the intended goal, the author set the following tasks: generalization of the historical experience of criminal liability for encroachment on the activities of institutions that ensure isolation from society; analysis of domestic and foreign scientific views and legislative provisions regarding the subject of research; identification of the causes, conditions and factors contributing to the commission of the disorganization of the work of institutions that ensure isolation from society. The result of the study was the study of the system of response to offenses of convicts and the factors that play a negative role in places of deprivation of liberty.

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### **Emotional Intelligence of Managers of Educational Organizations**

*A.A. Lifintseva, A.N. Anzuta, Ya.I. Sedinkin, L.F. Buksha*

*Immanuel Kant Baltic Federal University, Kaliningrad*

*Key words and phrases:* emotional intelligence; educational organization; education management.

*Abstract:* The study aims to analyze the features of the emotional intelligence of managers of educational organizations. The tasks are to characterize the specifics of the emotional intelligence of managers, its role in the management of an educational institution, the complexity of the development of emotional intelligence. The research methods are analysis, synthesis, and generalization. The results are as follows: the features of the emotional intelligence of managers of educational organizations are considered, as well as the possibilities for developing the emotional intelligence of managers and its role in the management of an educational organization.

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### **Significant Reflection of the Monuments of Kazan Architecture in the Course Design of Students-Architects of Kazan State University of Architecture And Civil Engineering**

*N.F. Ryabov*

*Kazan State University of Architecture and Civil Engineering, Kazan*

*Key words and phrases:* architectural education; Kazan architectural school; initial stage of

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education; architectural monument; semantic analysis; student-architect; educational design.

*Abstract:* Using the example of the course project “Study and graphical representation of an architectural object” of the discipline “Architectural design (level 1)” for the educational program “Architecture”, the article discusses the possibility of referring to the methods of semantic analysis in the work of a student-architect of the 1st year of study at the Institute of Architecture and design of Kazan State University of Architecture and Civil Engineering. The purpose of the study is to highlight a promising approach that determines the possibility of early formation of an architectural student’s idea of an architectural form as material and symbolic at the same time. The research objectives are to identify new opportunities in the content of course design; present the methodology of work using the techniques of semantic analysis; justify the choice of objects offered to the student for consideration and image; identify and describe the stages of educational work. The hypothesis is the assumption that the inclusion of semantic analysis techniques in the work of a student of the “Architecture” field of study contributes to the formation of a complete understanding of the architectural form. The research methods are analysis of theoretical and methodological literature on the problem of adaptation of semiotic approaches in architectural creativity; qualitative analysis of the progress and content of the educational process. The results are as follows: appeal to the objects of local architecture is substantiated; the course of conducting educational design is described; the semantic components of educational activities were identified, which include: field examination and graphic fixation of an object, identification of its figurative characteristics, aspect analysis of drawings, abstract work, search and use of elements of entourage and staffing in the design of a demonstration board. The author proves that the educational project of such content and procedural content is an effective form of “connection” of the student-architect of the initial stage of professional formation to the actual architectural problems.

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### **The Main Directions of Spiritual and Moral Development of Future Specialists in Socionomic Professions**

*A.B. Serykh, L.F. Buksha, A.A. Zaitsev, A.A. Lifintseva  
Immanuel Kant Baltic Federal University, Kaliningrad*

*Key words and phrases:* socionomic profession specialist; future specialist; spiritual and moral development; sociocultural space.

*Abstract:* The authors address the problem of spiritual and moral development of students-future specialists in socionomic professions. The purpose of the study is to present the main directions of the spiritual and moral development of future specialists, the implementation of which is carried out taking into account the influence of megafactors, macrofactors, mesofactors and microfactors, operating within the sociocultural space. The key directions of the spiritual and moral development of the future psychologist (ascent to knowledge, ascent to culture, ascent to values and meanings, ascent to oneself, ascent to the others), the basic principles of spiritual and moral development of future specialists in socionomic professions are presented. Particular attention is paid to the designation of specific methods, forms of work.

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### **Quality Control of Student Training in the Study of the Discipline “Criminal Procedure” at Naberezhnye Chelny Institute of Kazan (Volga Region) Federal University: Teachers’ Experience**

*Yu.G. Sled, L.M. Zakirova, G.Kh. Valiev  
Naberezhnye Chelny Institute – Kazan (Volga Region) Federal University, Naberezhnye Chelny*

*Key words and phrases:* control; quality; educational process; rating.

*Abstract:* The purpose of the article is to study the issue of quality control of knowledge of students studying the discipline “Criminal procedure”. The research objectives are to develop an algorithm for

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the process of controlling students' knowledge and skills. The study used the methods of analysis of scientific literature, generalization and systematization of personal pedagogical experience. The results are as follows: the technology of knowledge control with the help of information technologies in the discipline "Criminal Procedure", developed by teachers, is the most effective at Naberezhnye Chelny Institute of Kazan (Volga Region) Federal University.

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### **Application of Augmented Reality Technology in Higher Education Institutions**

*A.E. Ushakov*

*Novocherkassk Engineering and Reclamation Institute named after A.K. Kortunov, Novocherkassk*

*Key words and phrases:* digitalization; augmented reality (AR); quality of education; higher education; digital learning.

*Abstract:* The article is devoted to the issues of introducing digital technologies, in particular virtual reality, in educational institutions and assessing the readiness of students to perceive it. The purpose of the article is to provide information about the readiness of Russian educational institutions to implement this technology. The task of the study was to conduct research students to this technology. In this article, the following methods were used: analysis of modern domestic and foreign literature, a survey of students, as well as statistical processing methods. As can be seen from the results of the study, only some students could not evaluate the use of virtual reality; their number in all surveys and groups was no more than 10 %. About 84.3 % responded positively to classes conducted using digital technologies. There was also a longer concentration on the object, manifestations of more questions and discussions. Based on the results of this material, we can conclude that the introduction of augmented reality technology is necessary, as it contributes to the assimilation of competencies reflected in the Federal State Educational Standard (FSES). All this allows the teacher to track and correct in time the poorly seeded topics of the work program studied by the students of the discipline.

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### **Characteristics of the Concepts of "Emotional Intelligence" and "Stress Resistance"**

*O.L. Shepelyuk, S.V. Apaev, U.N. Fedorova*

*Surgut Institute of Oil and Gas – Branch of Tyumen Industrial University, Surgut*

*Key words and phrases:* overcoming life situations; stress; stress resistance; students; academic performance; emotional intelligence.

*Abstract:* The purpose of the article is to analyze the features of emotional intelligence and stress resistance. The research objectives are to determine the level of emotional intelligence and stress resistance of students. The research methods are observation, questioning of students of an educational organization, processing and analysis of the data obtained. It is found that the majority of students (48 %) have an average level of emotional intelligence and stress resistance; the most stress-resistant students are characterized by a high level of emotional intelligence.

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