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Preface

We are delighted to introduce the Book of Extended Abstracts for the LINK IT & EdTech24 International Scientific Conference. This conference, a joint initiative between the Faculty of Contemporary Arts and the Information Technology School, supported by the Institute for Contemporary Education, epitomises significant advancements in the integration of contemporary arts and information technology within educational frameworks.

The compilation of abstracts and extended abstracts in this volume encapsulates the core insights of each presentation, showing the innovative scope and depth of the scholarly discussions that transpired at the conference. These contributions highlight cutting-edge research and novel approaches, underscoring the progressive intersection of these fields.

The range of research and scholarship documented in this collection attests to the complexity and richness of the disciplines involved. The spectrum of topics addressed includes digital transformation and ethics, the role of interior design in business communications, the effects of technology on language instruction, and the influence of artificial intelligence in creative industries.

This conference, along with the publication of these abstracts, reflects our shared goal to converge leading minds in these fields, promoting an exchange of ideas, encouraging collaboration, and advancing academic discourse. With participants from diverse global backgrounds, the variety of perspectives, theoretical frameworks, and methodologies presented highlight the international reach and inclusivity of the conference.

We extend our heartfelt appreciation to the Scientific Committee, the reviewers, and the editorial team, whose commitment and exhaustive efforts have been pivotal in orchestrating this conference and ensuring the high calibre of these proceedings. Their dedication to upholding academic excellence and integrity remains fundamental to the success of this scholarly gathering.

Our gratitude also goes to all the contributors, whose rigorous research, enthusiasm, and commitment to their fields enrich this collection. This publication would not be feasible without their substantial contributions.

As you explore this Book of Extended Abstracts, we hope it serves as a valuable resource, enriching your knowledge and spurring further research, collaboration, and innovation in these dynamic fields.

Dr Valentin Kuleto, editor

Belgrade, 2024

Project and Financial Management in Architecture: Building the Foundations of Success

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Abstract

The critical roles of project and financial management in the architectural process are often overshadowed by the visual and structural aspects of the final construction. This study examines their impact on the actualisation of architectural plans, analysing current literature and case studies, and evaluating the effectiveness of management tools. The research emphasises that strategic planning and economic oversight are crucial for the success and sustainability of architectural projects, advocating for a synergistic approach to integrate creativity, financial planning, and project management expertise.

Keywords: Project Management, Financial Management, Architecture, BIM, Agile Methodology, ERP Systems, Budgeting, Project Costs.

Introduction

Architecture's visual masterpieces are not just manifestations of cultural and aesthetic values but also the result of meticulous project and financial management that guide these projects from conception to realisation. Effective project management in architecture involves more than merely overseeing construction sites; it encompasses the strategic integration of design intent with functional and budgetary requirements. Financial management complements this by ensuring that projects are financially viable, costs are controlled, and resources are allocated efficiently. The role of technology, particularly the use of Building Information Modeling (BIM) and Enterprise Resource Planning (ERP) systems, has become increasingly important, providing the tools necessary for architects and project managers to achieve a delicate balance between visionary designs and practical project deliverables. This paper explores how these management disciplines interact within the architectural context to turn innovative designs into sustainable structures, ensuring that they meet both the aesthetic expectations and functional needs of stakeholders.

This paper delves into the interplay between these areas, managing timelines, quality, and finances, to facilitate the transformation from concepts to tangible structures. Enterprise architecture, digital project management mechanisms, and effective communication strategies are essential in this interplay, providing a framework for aligning architectural projects with strategic business objectives (MDPI).

Methods

To investigate the roles of project and financial management in architecture effectively, this study adopts a mixed-methods approach, combining quantitative data analysis with qualitative insights. Initially, a systematic literature review was conducted to gather data from a range of academic journals, professional publications, and case studies, focusing on the integration of project management tools and financial strategies in architectural projects. This was complemented by semi-structured interviews with seasoned project managers and architects who have extensive experience in managing large-scale construction projects. The study also included an analysis of various project management software and tools, such as BIM and ERP systems, to assess their impact on project efficiency and communication. Data collected was then analysed using both thematic analysis for qualitative data and statistical techniques for quantitative metrics, enabling a comprehensive understanding of how sophisticated management strategies can enhance architectural project outcomes.

These enhanced sections provide a deeper insight into the sophisticated interplay between managerial strategies and architectural practice, setting the stage for a detailed exploration of specific management tools and methodologies in the subsequent sections of the paper.

Results

The findings of this research indicate that integrated project management in architecture not only optimises the immediate outputs of building projects but significantly enhances long-term operational and maintenance efficiencies. The analysis of enterprise architecture applications shows that these frameworks guide architectural projects through improved governance and strategic alignment with business objectives, reducing redundancies and promoting efficient resource use (MDPI).

Moreover, financial management techniques, which encompass rigorous budget forecasting and cost controls, have been shown to directly correlate with increased project efficiency and economic feasibility. Studies indicate that detailed financial planning helps mitigate risks associated with cost overruns and facilitates better investment decisions, thereby ensuring that projects are both feasible and sustainable over their lifecycle (MDPI).

The adoption of digital tools, specifically BIM and ERP systems, has transformed traditional project management by allowing for better visualisation, real-time tracking, and enhanced collaboration among stakeholders. The use of BIM technology, for instance, supports the detailed simulation of architectural projects, which improves decision-making and reduces the frequency and impact of design changes. This capability significantly aligns with sustainable construction practices by predicting project outcomes and optimising material and energy use during construction (Monograph).

Furthermore, the integration of Agile methodologies in project execution has addressed the dynamic nature of architectural projects, where changes are often inevitable and substantial. By adopting a more iterative and responsive approach, project teams are better able to manage complexities and adjust to new challenges as they arise, thus enhancing overall project agility and stakeholder satisfaction (Invensis Learning).

These results underscore the critical role of a well-orchestrated project and financial management strategy in the field of architecture, demonstrating that advanced management techniques and tools not only contribute to the successful completion of projects but also enhance their overall value and sustainability.

Discussion

Adopting a holistic approach to architectural project management necessitates a thorough understanding of both theoretical and practical aspects. Modern project management in architecture not only addresses the typical constraints of time, cost, and scope but also embraces the challenges of sustainability, stakeholder engagement, and technological integration. As such, project managers are increasingly reliant on sophisticated software to model not just the structure, but the lifecycle costs and environmental impact as well (Monograph).
Moreover, the dynamic nature of architectural projects, where changes are frequent and sometimes substantial, requires a flexible yet robust management approach. Agile methodologies, once primarily the domain of software development, have found relevance in architectural practice, providing the adaptability needed to manage such complexities (Invensis Learning).

Conclusion

Project and financial management are foundational to the success of architectural projects. Mastery of these areas enables the realisation of designs that are not only aesthetically pleasing but also economically sustainable. The future of architectural project management lies in the ability to adapt to new technologies and methodologies, ensuring that projects are not only completed within their fiscal and temporal parameters but also meet the increasing demands for sustainability and client satisfaction.

References:

1. "Enterprise Architecture Approach for Project Management and Project-Based Organisations: A Review", Sustainability, 2022. Available at: https://doi.org/10.3390/su14169801
2. "Architect Critical Challenges as a Project Manager in Construction Projects: A Case Study", Hindawi. Available at: https://www.hindawi.com
3. "A Digital Project Management Mechanism Based on Enterprise Architecture", Francis Academic Press, 2023. Available at: https://doi.org/10.25236/AJBM.2023.052108
4. "Architect's Guide to Project Management", Monograph. Available at: https://monograph.com

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Robots as an Educational Tool in Working with Students with Developmental Challenges

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Abstract

A student with developmental disorders, whose physical, mental, or emotional growth, development, and maturation are impaired, has the right to special care, education, and vocational training to ensure a complete and dignified life, achieving the highest level of autonomy and social integration (*Convention on the Rights of the Child*, 1989). A student with developmental challenges is, above all, a child. "Every child, whether disabled or not, has the same basic needs – to be loved, accepted, and safe" (Došen, Gačić-Bradić, 2005). Developmental challenges should not be a basis for any form of discrimination, but sometimes, it is necessary to find special ways for students to meet their needs. Students with developmental challenges should be given the opportunity to develop and live within the limits of their capabilities (Hrnjica, 2004). Although there are official classifications of developmental disorders, various divisions exist in practice based on authors' theoretical orientations. The classification recommended by the OECD-formed Commission is most useful for educators. This scheme uses functional areas where disorders occur as classification criteria. All listed areas are relevant to the education process (Hrnjica, 2011). The OECD team focuses on improving the status of students with developmental challenges and proposed the following classification of developmental disorders:

- *Impairment of sensory functions* includes all degrees of impairment of vision, hearing, and sensory disorders affecting tactile sensitivity, pain, touch, movement, and balance;
- *Disorders of cognitive, intellectual, perceptual, and attention functions* encompass all degrees of mental retardation, learning difficulties caused by organic or social reasons, speech dysfunction, attention disorders, oculomotor perceptual disorders, and similar issues;
- *Disorders of muscle control* include all muscle disorders that hinder student movement, direct communication, and interaction with the environment (e.g., cerebral palsy, orthopaedic disorders, speech articulation disorders, amputations, muscle weakness conditions, etc.);
- The group of *physical health impairments in students* includes metabolic and physiological disorders such as asthma, congenital heart diseases, life-support system dependence, diabetes, and similar conditions;
- *Emotional childhood disorders* group includes situational emotional disorders resulting from family crises, childhood neuroses, childhood psychoses, emotional changes due to nervous system damage, etc.;
- *External factors* group comprises external social influences arising from family or broader social environments that hinder successful student development. Examples include

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dysfunctional and chaotic families, inappropriate and inadequate parental behaviour, student abuse by parents, severe parental neuroses, parental psychotic states, etc. This group also includes severe socialisation disorders (hyperactivity, aggressiveness, delinquency, and other socially unacceptable behaviours).

Students with developmental challenges learn in different ways, so it is often not easy to find the best methods. Sometimes, multiple methods must be tried before finding a successful one. The easiest way to ensure student success is to combine different strategies, methods, forms, and resources, as well as create opportunities for alternative learning experiences, adapt curriculum, and frequently change activities to meet the needs of all students. Play is the foundation of a child's development, as it helps develop physical, cognitive, emotional, and social skills. This paper explores the role of robots as educational tools in working with students who have developmental challenges. It discusses how robots can support students with a spectrum of developmental difficulties, including autism, ADHD, specific learning difficulties, and other conditions. The focus is on how robots can facilitate learning and provide personalised support to these students. The paper also considers the advantages, challenges, and implications of using robots in the education of children with developmental challenges. Children learn through all senses, so the focus of education should be on practical exercises, and the use of educational robotics plays a significant role in stimulating learning and developing thinking skills. Programmable robots are also beneficial for typically developing children, enabling them to develop creativity, logical thinking, collaboration skills, teamwork, and skills that will be useful in the future. Studies in this area of research have shown that through programming activities, typically developing children enhance computer-related skills, including planning, logic, and algorithmic sequences (Critten et al., 2021). Robots can be adapted to support students requiring additional educational support. They can be used as communication aids, concentration aids, or even therapeutic tools. Through interaction with robots, students with various developmental challenges can learn social skills. Using robots, the approach to each student's work can be adapted through individualised lessons and exercises that meet their needs and learning styles. Educational policies and curricula worldwide have shifted focus to the role of computer education in the development of young children (Manches & Plovman, 2017). Educational robotics activities provide engaging and motivating learning environments, allowing students to learn in diverse ways.

Keywords: Developmental disorders, students with developmental challenges, inclusive education, robotics in education, programmable robots.

Creating a Java application for monitoring and controlling an Arduino microcontroller board

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Abstract

This paper explores the creation of an application for monitoring and controlling an Arduino board using a combination of the Java programming language and the Arduino development environment. Digital computer systems have become crucial in today's world, providing the ability to program for various tasks. The aim of this project is to establish communication between the Arduino board and a graphical interface written in the Java programming language. The application is designed to control two LED diodes and display sensor information from the Arduino board within a Java desktop application. The paper consists of five parts: the first part describes the hardware used, the second part explores the Java programming language, the third part details the connection of components, the fourth part focuses on programming in different development environments (NetBeans and Arduino IDE), while the fifth part demonstrates the project. This paper provides a practical insight into implementing an application for monitoring and controlling an Arduino board using the Java programming language.

Computer science and informatics have become foundational areas of modern society, enabling rapid progress through continuous digital transformation. In this context, the research focuses on creating a Java application for monitoring and controlling an Arduino board. By integrating the Java programming language and the Arduino development environment, this research explores the implementation of a systematic and functional approach to establishing a connection between computer software and electronic components through standardised graphical user interfaces. This integration process not only enables efficient interaction between different technological aspects but also provides the foundation for developing robust applications that meet the needs of the modern digital paradigm. Key research methodologies include a thorough analysis of the hardware components used in the project, a detailed study of the Java programming language and its object-oriented programming approach, as well as the integration of these components into a unified system. Additionally, the programming process is implemented using various development environments, including NetBeans and Arduino IDE. Through an experimental approach, the research focuses on testing the functionality of the application and analysing the obtained results.

The process begins by defining the pins, where pins 13 and 12 are set as digital outputs and analogue input A1 is reserved for the sensor, all as type int. In the "setup()" function, pins are configured using pinMode. Reading values from the sensor and printing to the Serial monitor is achieved using analogRead and Serial.println, with a delay of 50ms. In the initial part of software development, commands for communication between the computer and Arduino via serial connection are set up. Arduino interprets received characters, toggling LED diodes accordingly. In the final programming phase, the key task is to develop a Java application that enables real-time communication with the

Arduino board, allowing simultaneous control. This application enables the independent functioning of Arduino from the Arduino development environment, as the entire code is already within the microcontroller. Therefore, only a Java application is needed to manage the Arduino board, specifically the LED diode in this case. By focusing on key parts of the code and the library used, such as "jSerialComm-1.3.11.jar", which enables independent communication, understanding and further work on the project are facilitated. The process of creating the Java application starts with designing the graphical interface, where all necessary elements are added.

The implemented Java application enables the control of LED diodes and the display of sensor data from the Arduino board via a graphical user interface. Through detailed analysis, the successful achievement of the research objectives has been confirmed. Research results indicate the functionality and stability of the system within the context of its primary purpose. The research emphasises the importance of integrating different technologies to achieve efficient solutions in the fields of computer science and electronics. The potential for enhancing the application by adding new functionalities or optimising existing ones is explored, highlighting possible opportunities for performance improvement and functionality expansion to better meet user needs. Additionally, challenges encountered during the implementation process are considered, along with potential solutions that could contribute to enhancing system performance. This study represents an important step towards better understanding the process of creating applications for monitoring and controlling electronic components using a combination of Java programming language and Arduino development environment. The implemented system provides a foundation for further research and development in this area, highlighting the potential for improvement and functionality expansion in the future.

Keywords: Java application, Arduino, Graphic interface, NetBeans, LED diodes.

Wikipedia in the Classroom: Use Case from Secondary and Higher Education in Serbia

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Abstract

Introduction

Wikipedia is a free online encyclopedia edited by volunteers around the world and hosted by the Wikimedia Foundation. Serbian Wikipedia is the 22nd largest Wikipedia in the world, with 365,959 registered users and more than 688,000 articles, which makes it suitable to become a common practice in a wide variety of educational domains. In this paper, we present the preliminary results of a pilot cooperation between the Faculty of Computer Science, Šabac Grammar School, and Wikimedia Serbia. The main goals of this cooperation are to introduce the possibilities of Wikipedia and to promote building the skills in editing Wikipedia to students in higher and secondary education institutions.

Materials and Methods

For the first year of this cooperation, 20 fourth-year information technology specialised high school students at Šabac Grammar School and 20 third-year undergraduate students at the Faculty of Computer Science and Informatics of the University Union Nikola Tesla were involved in this research and coordinated by the authors of this paper. We divided our research into four main phases: the initial phase, the informative phase, the proactive phase and the evaluation phase. We used structured questionnaires as a method for the first and fourth phases. Both questionnaires were in Serbian language and they consisted of 10 basic but informative questions. We collected questionnaire answers separately for grammar school students and faculty students and used descriptive statistics to explain the perception of respondents about Wikipedia usage. In the informative phase, lectures about Wikipedia and its main concepts, and training about Wikipedia editing were given to the students of both groups separately, while in the proactive phase, students chose assignments in the scope of the course taken, but based on their interests and created Wikipedia articles.

Results

The first phase questionnaire gave us an insight into the current status of student perception of Wikipedia and its usage, and from the fourth phase questionnaire, we expect to show our progress in the Wikipedia education process. Results of the first phase revealed that 15% of surveyed high school students and 30% of surveyed undergraduate students tried to edit Wikipedia in the past, and 33% of them in both groups have done this successfully. Half of the surveyed undergraduate students perceive Wikipedia as an internet encyclopedia, 55% of surveyed high school students perceive

Wikipedia as an online source of information, and 30% of students from both groups think of Wikipedia as an online source of information. Most of the respondents from high school use Wikipedia for online searches, while the respondents from faculty use Wikipedia equally for writing essays, expanding knowledge, and online searches. Almost half of the high school students (45%) and 70% of undergraduate students are aware of the accurate definition of referencing, but when it comes to proper implementation, percentages are decreased to 20% for undergraduate students, and for high school students, it almost stays on the same level (40%). The majority of the respondents from high school (75%) and half of the respondents from faculty are aware of copyrights, but only 30% of high school respondents and 40% of university respondents do know more than two existing copyright licenses.

After completing the initial phase, we identified different levels of three emerging problems in both educational facilities: unawareness of Wikipedia possibilities, reference importance and usage, and license importance.

For now, 30% of undergraduate students and 0% of high school students finished their assignments, so we can only partially evaluate our research. Respondents think that informative phase lectures and training were very good, very useful, and very understanding. They also think that editing Wikipedia is very interesting, relaxing, and easy and they are very satisfied with the availability of the instructor during the proactive phase. Also, university students find the notions of referencing and licensing more clear than before the informative phase and they are able to accurately define these notions and apply them to their work.

Discussion: We are currently finishing the third phase, and starting the fourth phase of this research, and obtained results are preliminary but promising. Available results are based on the completed first two phases for all students and results of the several students who finished their assignments and completed the fourth phase questionnaire. Results from the initial phase directed this study and helped us to focus on emerging problems. Although only several students from one educational facility finished their assignments, preliminary results from the evaluation phase showed that understanding the importance of curation of Wikipedia, license and adequate reference usage is significantly raised in the student population of the higher education facility and we expect the same for the high school students.

Keywords: E-learning, Higher Education, Secondary Education, Wikipedia, Serbian language.

Integration of IT Tools in the Transformation of Process-Oriented Organisations

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Abstract

This paper examines the critical role of IT tool integration within process-oriented organisations and its impact on enhancing operational efficiency and strategic alignment. It highlights the common challenges faced by companies due to suboptimal integration practices, such as isolated IT systems that fail to support holistic business processes and a lack of coordination between different organisational functions. Through qualitative analyses, including case studies and interviews conducted across various industries undergoing digital and organisational transformations, the study identifies key barriers and offers strategic recommendations for effective IT integration. The findings emphasise the importance of aligning IT tools with clearly defined business processes to foster enhanced synergy, reduce costs, and improve decision-making capabilities. This paper argues for a more coordinated approach to IT integration, advocating for the formation of cross-functional teams to ensure that IT tools are not only implemented effectively but are also continuously improved to support the dynamic needs of process-oriented organisations. Ultimately, the successful integration of IT tools propels companies towards greater competitiveness and operational excellence.

Keywords: IT Tool Integration, Process-Oriented Organisations, Digital Transformation, Business Process Optimisation, Analytical Tools.

Introduction

Changes in organisational structures are ubiquitous, with the shift from hierarchical to process-oriented structures marking a significant shift in how companies operate. Traditional approaches to IT tool implementation often overlook key processes, leading to suboptimal resource use and a lack of synergy between different parts of the organisation. This paper explores how proper process alignment can transform the use of IT tools in companies, enabling synergy and deeper insights into all aspects of business (Hammer, 1990).

Properly aligning business processes plays a crucial role in the effective use of IT tools, enabling optimisation of existing operations and creating new value for the company. When processes are clearly defined and aligned with the organisation's strategic goals, IT tools can be precisely targeted to support these processes, thereby increasing their efficiency and effectiveness. Clearly defined

processes allow for the integration of IT tools in a manner that directly supports business goals. This type of integration helps reduce costs and improve satisfaction among owners, employees, and clients. When processes are well-established, IT tools can provide deeper insights into the business through advanced analytical capabilities, enabling leaders to make informed decisions based on reliable, updated information. Aligning IT tools with processes enhances synergy between different departments, allowing teams to operate in a coordinated manner, reducing duplication of efforts and enabling more efficient work towards common goals (Porter, 1985).

Methodology

The research relies on a qualitative analysis of current practices in the implementation of IT tools across various companies, conducted through case studies during their organisational and digital transformations, and interviews with managers and employees. The methodology includes detailed mapping of business processes and evaluation of IT tool use across various business functions – from procurement and warehouse operations to production, logistics, and sales. The analysis focuses on identifying obstacles that hinder the effective integration of these tools, with the aim of providing concrete recommendations for improving efficiency and effectiveness in using IT resources within companies (Yin, 2003).

Results

The study revealed significant challenges in the implementation and use of IT tools within companies, which directly affects their ability to maximise the benefits of technology. One of the primary problems is the use of analytical tools that are not integrated with comprehensive Enterprise Resource Planning (ERP) systems. Such tools often lack the necessary quality and scope of data, resulting in reports that are neither guiding nor valid. For example, analytical tools that operate in isolation can provide superficial insights, but without connectivity to an ERP system that tracks all business functions, it is difficult to gain deeper insights into operational performance and strategic needs (Davenport, 1998).

Additionally, there is often an over-reliance on accounting software focused only on recording incoming and outgoing documents, without providing deeper analytical insights into the nature of costs. This limits companies' ability to effectively control, as managers cannot adequately monitor or respond to changes in costs or profit margins. Accounting software is essential for basic financial operations, but its isolated use without integration with analytical systems that enable deeper cost analysis misses opportunities for optimising financial management (Kaplan & Norton, 1996).

Furthermore, a lack of coordination between sales and warehouse operations was identified. While sales departments use advanced Customer Relationship Management (CRM) systems, warehouse departments are often neglected and do not use Warehouse Management Systems (WMS). This disconnection leads to frequent logistical errors and product service issues because there is inadequate integration of warehouse data with sales data, complicating accurate inventory tracking and efficient order fulfilment (Laudon & Laudon, 2016).

Also, project-oriented companies relying on Excel spreadsheets for project management face challenges due to the lack of integration of these tables with centralised IT systems. This approach

complicates effective tracking of progress and resources, crucial for project success, and can lead to cost overruns and delays in implementation (Schwalbe, 2015).

In production operations, inadequate tracking of material usage, often due to not using IT tools for recording work orders and bills of materials, makes it difficult for companies to efficiently manage margins and product pricing. The lack of precise cost data complicates the application of strategies such as price differentiation or targeted product positioning, which can result in poor procurement decisions, excess inventory, or a lack of key materials, further complicating the production process and logistics (Chase et al., 2006).

These results indicate that companies must reevaluate their approach to integrating IT tools, especially in terms of how technology can be used to improve coordination and efficiency between different business functions. Only through comprehensive and coordinated implementation of IT solutions can companies expect to achieve desired outcomes and fully leverage the potential of available technological resources.

Discussion

The discussion emphasises the importance of a holistic approach in the integration of IT tools, where it is essential to understand how different tools fit into the complete picture of business processes. In many companies, IT operates in silos, where different departments do not communicate effectively, creating gaps in information flows and reducing the efficiency of operations. Also, the analysis showed that achieving synergy requires better coordination between IT departments and other sectors within the company. It was discussed how adequate integration of IT tools can significantly improve efficiency, reduce costs, and enable companies to respond more quickly to market changes. The formation of cross-functional teams that work together to define needs and expectations from IT tools, as well as their implementation and continuous improvement, is proposed.

Conclusion

The integration of IT tools into process-oriented organisations represents a key strategy for achieving greater operational efficiency and competitiveness. The key to success lies in understanding that tools should work for the company, not the company for them. Through proper understanding and implementation, IT tools become not only support but also drivers of business success. The success of this integration requires continuous investment in technology development, employee education, and above all, a clear vision of how IT can serve business objectives, enabling the creation of a stable and efficient infrastructure that supports all aspects of business and enables real transformation through digitalisation.

References:

1. Chase, R. B., Jacobs, F. R., & Aquilano, N. J. (2006). Operations Management for Competitive Advantage. McGraw-Hill/Irwin.
2. Davenport, T. H. (1998). Putting the enterprise into the enterprise system. Harvard Business Review.
3. Hammer, M. (1990). Reengineering Work: Don't Automate, Obliterate. Harvard Business Review.
4. Kaplan, R. S., & Norton, D. P. (1996). The Balanced Scorecard: Translating Strategy into Action. Harvard Business School Press.
5. Laudon, K. C., & Laudon, J. P. (2016). Management Information Systems: Managing the Digital Firm. Pearson.
6. Porter, M. E. (1985). Competitive Advantage: Creating and Sustaining Superior Performance. Free Press.
7. Schwalbe, K. (2015). Information Technology Project Management. Cengage Learning.
8. Yin, R. K. (2003). Case Study Research: Design and Methods. Sage Publications.

Radnović, V., Prodanović, B., Stojaković, D., Radnović Vukčević, J., & Lučić, T. (2024). Integration of IT Tools in the Transformation of Process-Oriented Organisations. In V. Kuleto (Ed.), Book of Extended Abstracts: 2nd LINK IT & EdTech International Scientific Conference – LINK IT&EdTech24, (pp. [pages]). Belgrade, Serbia: [Publisher Name if available]. ISBN: 978-86-87175-47-1.

The Technological Environment as a Source of Managerial Stress in the Process of Enhancing Digital Competencies in Educational Organisations

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Abstract

Today's era is characterised by innovation across various sectors including information technology, telecommunications, biotechnologies, and the emergence of new production technologies and materials. These innovations have enabled the creation of products and services that were considered science fiction just a decade ago.

Technological changes are controlled by humans, both as creators and users of these achievements, profoundly shaping humanity's destiny and, consequently, the operations of educational organisations. Thanks to the development of information and telecommunication technologies, there has been a shift in communication methods (within organisations, with the environment, and in the market itself) and the organisation of educational institutions. The increased share of knowledge in newly created value marks the transition from the industrial era to the new economy, also referred to as the knowledge economy, where information and knowledge are crucial business success factors: knowing what, how, where, and when.

Technological changes, such as the explosion of information technologies, necessitate that educational organisations continuously work on improving digital competencies at all levels. This shift introduces a new chapter and term – "technostress", which leads to various problems related to managerial stress in the enhancement of digital competencies: information overload, the flood of digital channels, loss of privacy, absence of face-to-face contacts, the necessity of constant upskilling, and the inability to advance due to a lack of formal and informal education.

It's also important to mention the so-called "creative destruction" process, which describes how new inventions disrupt and outdate previous ones, exposing employees to additional layers of managerial stress in the process of enhancing digital competencies. This, if not timely diagnosed and managed, can lead to negative implications.

Significant technological changes often lead to a loss of identity. The explosion of information makes it difficult to distinguish reality from science fiction, inevitably leading to an identity loss essential for every human. Homo sapiens are increasingly becoming homo technicus, characterised by how they work, entertain, live, and educate – with less spontaneity and more scientifically programmed rationality.

All of the above contributes to creating managerial stress in the process of enhancing digital competencies in educational organisations, which, if not creatively managed, brings negative implications for all employees and the entire educational organisation. By adequately anticipating, adapting, and managing changes in the technological environment, managers in the process of enhancing digital competencies have the opportunity to create suitable conditions for generating optimal managerial stress in the context of human resource management.

In the knowledge society, human resource management plays a central role in directing managerial stress into optimal frameworks in the process of enhancing digital competencies. In this context, human resource management has a creative and motivating effect in achieving competitive advantages, representing a significant shift from the concepts of the traditional industrial society. Employees, once seen as a secondary support resource, now hold a primary position as creators of business processes, thanks to their knowledge and performance.

Human resource management ensures operational, intellectual, social, and emotional integration within educational organisations in the process of enhancing digital competencies. It emphasises individual and organisational performances, fostering synergistic effects at the organisational level.

Human resource management is significant for managing stress in the process of enhancing digital competencies, directing it into frameworks where it exhibits a positive dimension, aimed at enhancing the effectiveness of both individual business activities and overall outcomes.

By involving all employees in decision-making processes and making them responsible for the results, human resource management creates conditions for generating optimal managerial stress in the process of enhancing digital competencies, motivating not only event managers but all participants to achieve maximum results and effects. This basis constitutes a specific management of managerial stress, within the context of human resource management, as an integral subsystem of the management of educational organisations. The management of managerial stress involves strategically directing stress into creative and motivating frameworks, enhancing individual and organisational goals in the process of enhancing digital competencies.

Keywords: Educational Organisations, Human Resource Management, Digital Competencies, Managerial Stress, Management of Managerial Stress.

References:

1. Davenport, T. H., & Prusak, L. (1998). Working Knowledge: How Organisations Manage What They Know. Harvard Business School Press. This reference supports discussions on knowledge management and its critical role in educational organisations.

ICT in real program of kindergarten

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Contemporary society is characterised by rapid and intense development of information and communication technologies, which significantly influence changes in all aspects of life. Innovations are increasingly being introduced into the education system, including schools and preschool institutions, where computers, applications, and artificial intelligence are becoming key didactic tools. However, along with these innovations come certain economic and staffing challenges. Kindergartens are now expected to be equipped with modern technologies, and educators are expected to possess competencies in their application.

One frequently asked question is how ready we are to embrace innovative technologies in the educational process. The introduction of information technologies into kindergartens is no longer a matter of prestige or trend; it has become a necessity. This provides an opportunity for creatively searching for more effective working methods, acquiring new knowledge, and facilitating collaboration and information dissemination. Educators are now expected to modernise their work, use contemporary technologies and methods, and introduce children to basic concepts of information and communication technologies.

However, many educators face challenges such as lack of equipment, unstable internet connections, or insufficient competencies in using ICT. How can we continue to improve our work in these circumstances, use ICT as a tool for constructing knowledge, and develop digital literacy in children? With this question, we began our research and creative process, setting a dual goal: on one hand, we want to empower and support educators facing challenges in applying ICT in their daily work, offering examples that do not require significant resources or high competence; on the other hand, our aim is to enrich pedagogical practice with new technologies and develop "computational" thinking skills in children.

In this paper, we will present the application of contemporary information technologies in the educational program for preschool-aged children. We will introduce concepts of initial coding using tools such as Bee-Bot, Pixel art, QR codes, and e-books. Using robots, coding, and working with pixels and QR codes in a real environment can significantly contribute to the development of computational thinking in children. By thinking like programmers and exploring new possibilities, we are actually preparing children for a future that will require creative solutions to the challenges of modern society.

Keywords: Child, educator, Bee-Bot, Pixel art, QR code, E-book.

Using Google Suite in EFL Classes at the Faculty of Contemporary Arts in Belgrade from 2020-2024

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Abstract:
The COVID pandemic ushered in changes in educational systems around the world and promulgated online educational tools in order to conduct classes and keep the academic year flowing. Hence, in the spring of 2020, Google emails were assigned to all students at the Faculty of Contemporary Arts in Belgrade. This change was made as an immediate response to a worldwide crisis and compelled educators to rethink how work can be done and how knowledge can be conveyed in an efficient manner without the presence of students in the classroom. The school provided streaming services, and this meant that the lectures were not only live-streamed, but they were also available as recorded material for later viewing. Students could view both versions from the comfort of their home. Additionally, having Google emails meant that professors could use all the amenities of Google Suite in order to stay on track with the curriculum and stay in touch with the students. Teaching college-level secondary language online was a challenge during the pandemic. I teach English as a foreign language, and contrary to popular belief, it is more challenging teaching English than other languages. The fact of the matter is that the gap between students' informal conversational skills, which they insist on, and their formal writing and grammar skills was appalling. Students believed that they knew enough, yet their tests and exams showed poor knowledge of the formal use of English. With the onset of the new online teaching format, the in-class interactions and the discussions, which contributed greatly to the formal and direct learning of a foreign language, ceased. During the 2020 spring semester and the 2020/2021 school year, English as a foreign language (EFL) classes at the Faculty of Contemporary Arts were reduced to viewing live stream lectures of the professors or to viewing the recorded classes. The option of coming in for consultations existed, but students relied mostly on going to them for their major courses. Bridging the aforementioned gap became even more difficult. Yet, the option of using Google Suite made it possible for online classes to have more quality and gave way to opportunities regarding various teaching tools that solely recorded lectures did not. For this reason, Google Suite and, within it, Google classroom, has been an integral part of EFL classes at the Faculty of Contemporary Arts since the Spring of 2020. After the pandemic ended, I chose to keep using Google Suite for EFL classes, and this paper will convey the results that have been collected for the past four years.

The scope of this paper focuses on the results of using Google Suite at the Faculty of Contemporary Arts for teaching English 1 and English 2 (each one semester in length), which cover material from level A2 through level B2 of the Common European Framework of Reference (CEFR). Google classroom and Google Meet were the first tools that were used in class and then Google Slides, Google Forms, and Google Sites followed. This paper will show the results of adding various parts of Google Suite during online and ground classes. The purpose of the paper is to compare the findings of the use of Google Suite for EFL classes at the faculty of Contemporary Arts and the findings of others. Google classroom has been in use globally since 2014, and while a great deal has been published on the general use of Google classrooms in elementary and secondary education, not much has been done on the use of Google classrooms (and Google Suite *en general*) in college-level EFL

classes. As a result, this paper will contribute to the overall research on the use of Google classrooms in education and more specifically in EFL classes. Gathering information and experimenting with the range of tools in Google Suite for the purpose of teaching English as a second language was the main method that was utilized over the course of the past four years. The results of using Google Suite in the academic years 2020/2021. 2021/2022, 2022/2023, and 2023/2024 are described in detail; the tables show percentages, while all data is displayed in chronological order. The results will show that overall using this educational tool was positive and valuable. It is also important to state that during the Spring semester of 2020, only Google mail and Google Meet were used. The discussion focuses on the justification of the choice of certain Google Suite tools and why others were avoided. It also shows how these findings are relevant in today's scholarly discussion on using Google Suite, and how it is relevant to other works done in the field. Thus, this paper will show the findings of using Google Suite as an educational tool in college-level EFL classes at the Faculty of Contemporary Arts in Belgrade from 2020 to 2024 in which the advantages and disadvantages of this tool in online and ground classes will be discussed.

Keywords: Google Suite, college, EFL classes, Google classroom, advantages, disadvantages

Ethical and legal aspects of using artificial intelligence in marketing

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Introduction

This paper focuses on contemporary methods of employing artificial intelligence in marketing, along with the economic, legal, and ethical aspects of this phenomenon. The research examines the growing adoption of AI by companies, primarily in the field of marketing. Specific modalities of using this technology are presented, such as individual machine learning systems, and individual and integrated automated applications, and their impact: creating personalised messages for consumers. The aim of this work is to highlight the fact that AI, using both location and behavioural analysis of customer needs, achieves exceptional economic effects on one hand, while leaving open questions about the legality and ethics of using synthesised data on the other.

Methods

Formulating and systematising a wide spectrum of AI usage in marketing initially requires an observational method providing a phenomenological insight into its nature and impact on consumer behaviour, habits, and potential harm. The interaction of AI and consumers is situated within a broader ontological and moral context that structures and defines the mutual impact of these phenomena. Using a comparative method, the three most important segments of AI are analysed: individual machine learning systems, and individual and integrated automated applications. The ethical and legal consequences of these interactions are synthesised and analysed deductively from these general categories.

Results

Research results indicate that, although AI is still predominantly used in narrow tasks within marketing and definitely yields significant results, its usage undoubtedly encroaches upon the boundaries of universal freedoms and ethical issues as a whole. The paper argues that AI-based marketing employs advanced algorithms and models to analyse data sets and identify future consumer behaviour patterns and trends.

In addition to simple standalone applications, integrated applications incorporating machine learning are increasingly used, enabling precise targeting and personalised messaging to consumers. Machine learning simultaneously facilitates the processing of large amounts of data and making complex predictions and decisions, while also segmenting customers and predicting their responses to promotional content. This process is highly prominent in so-called "programmatic" purchasing,

related to online advertising and the establishment of long-term customer relationships (CRM). This type of purchasing presents significant ethical challenges, primarily concerning the protection of personal data and the transparency of the purchasing process as a whole.

Research conducted by the authors revealed the existence of standalone applications, isolated AI programs, separated from primary channels through which customers learn about and purchase a company's products and services. When using such applications, users are unaware that their data is being used by a third party or company associated with the application. This manner of AI usage raises not only ethical but also internet security concerns.

Lastly, the third segment of AI usage in marketing consists of integrated applications that are integral parts of existing systems and make decisions on which advertisements to offer to individual consumers based on their preferences. Simultaneously, these systems can evaluate and rank potential consumers based on their likelihood of purchase, with some offering customer service. The legal and ethical implications of such integrated systems are certainly the most comprehensive as they encompass the entire process of customer-seller interaction, from advertising goods or services to customer service and the establishment of some form of lasting contact or loyalty between consumers and sellers.

Discussion

By employing advanced models, AI-based marketing can provide deeper insights into consumer behaviour. The rise of digital technologies and big data analytics has enabled the collection and analysis of extensive data from multiple sources, including social media, mobile devices, and online transactions. This has provided companies with the opportunity to gain insights into consumer behaviour and preferences and offer consumers more personalised and engaging content.

Although this technological shift has the potential to optimise marketing strategies and deliver highly personalised experiences to consumers, its use in marketing can lead to unintended consequences, making it important to consider the ethical implications of AI usage in marketing practices. As indicated in the results of this study, this primarily concerns privacy, data security, data ownership, and the transparency of the process itself. Protecting consumer privacy and autonomy is an important issue focused on maintaining the confidentiality and security of consumer data in the digital age.

Other ethical consequences relate to the potential for changing consumer habits or opinions as well as discrimination based on their ranking by certain applications. Additionally, sophisticated techniques are often used to influence consumer decisions, attitudes, and behaviours through persuasion and manipulation, sometimes resulting in consumers making decisions that are not in their best interest, such as purchasing products they do not need or cannot afford.

From all the above, there is a recognised need to inform consumers about the data being collected and how it is used, which is a key aspect of transparency. By providing this information, companies can foster consumer trust, which is crucial for the success of AI marketing. At the same time, the paper emphasises the need for the application of laws and regulations on data protection to prevent companies from abusing consumer data for their benefit. It is essential to establish clear data

protection regulations, increase transparency and accountability in data collection, and implement consumer education.

This paper can serve as a proposal for future research for legislators and marketing experts to better understand the inviolability of consumer privacy and individual autonomy, which is guaranteed, among other things, by numerous international conventions.

Keywords: Artificial Intelligence, Marketing, Ethics, Law, Consumer Privacy.

The effect of IT tools on knowledge management practices in Carnival Cruise Lines: Moderating role of job position

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Abstract: Rapid development of technology, and dynamic surroundings created a need for a organizational culture, and strategy based on knowledge management and usage of IT tools, which can create organizational knowledge that will further positively impact organizational performances. Many companies in developed countries, such as USA have accepted this new way of doing business to improve their competitive position. In today's knowledge-driven economy, organizations acknowledge information technology (IT) and knowledge as a strategic resources to ensure a competitive advantage and growth of organizations. Knowledge management (KM) is an integrated process that collects, stores, disseminates and applies knowledge in an organization. The use of information technology (IT) in supporting knowledge management (KM) is considered as an valuable tool that supports discovery of new knowledge, storage, sharing and usage of existing knowledge. IT tools such as intranet-based systems allow people to work together and collaborate interactively. Furthermore, individual knowledge is thus converted into organizational knowledge through knowledge sharing, storage and usage with the help of IT tools. In that sense, this study aims to analyze the connection between these two variables. Most specifically, the paper will focus on the influence of IT basic tools and IT advanced tools, as an independent variables on knowledge management practice, moderated by categorical variable, job position, in the Carnival Cruise Lines company.

Objectives: First, this research intends to study and investigate the relationship between IT tools (basic and advanced) and knowledge management in Carnival Cruise Lines Company. And, second objective is to analysis how job position as a categorical variabile, the moderator, affects the relation between an exogenous variable (IT tools) and an endogenous variable (KM).

Purpose: The present paper intends to fill in the gap in the current literature by analysing model of IT tools effect on knowledge management adding categorical variable job position as a moderating factor in the relationship between IT basic tools and KM, as well as, in the relationship between IT advanced tools and knowledge management (KM).

Methods: Research employed quantitative research design and primary data were collected through a questionnaire survey on board three Carnival Cruise Lines ships during a year 2023.The questionnaire was developed based on past researche, i.e., IT basic tools was measured using 3 items, IT advanced tools were evaluated by 4 items, while KM was assessed by 6 items. The sample size used for the analysis consists of 247 participants on different hierarchical level employed in Carnival Cruise Lines company, located in Miami, Florida. Partial Least Squares Structural Equation Modeling (PLS-SEM) technique is adopted to explore relationships among variables. In addition, the moderation analysis was performed to investigate the moderating role of job position in the relationship between IT tools (basic and advanced) on knowledge management (KM).

Results: The results showed the significant impact of IT basic tools on knowledge management practices (β = 0.219, p = 0.017), as well of IT advanced tools on KM practices (β = 0.436, p = 0.000),

indicating a positive relationship between these variables without considering the moderator. When moderator variable, job position, was included, moderating effect showed low and statistically insignificant (β = 0.007, p = 0.957) in the relationship between IT basic tools and knowledge management (KM), showing that there is no moderating effecat of job position in relationship between IT basic tools and knowledge management (KM). On the other side, relationship between IT advanced tools and knowledge management (KM) remain statistically significant and positive (β = 0.327, p = 0.002), suggesting that the relationship between these two variables is moderated by the categorical variable job position (β = - 0.417 , p = 0.000), and was furthere explained by simple slope analysis.

Discussion: In general, the findings suggest that an open innovation culture with usage of information technology is more likely to increase the efficiency of knowledge management practices. Finally, the obtained results in this study support primary assumptions, and it was found that in this study, that IT tools have a statistically significant and positive influence on knowledge management (KM). Futheremore, it was found that job position does not moderating the relationship between IT basic tools and knowledge management (KM), which can be interprate that different hiyararhical level of employees use equaly basic IT tools. However, relationship between IT advanced tools and KM it is been moderated by job position, which shows that 37.7% of crew as participant in company Carnival Cruise Lines survey, do not really understand usage of IT advanced tools in the day-to-day operation.

Conclusions: Management should motivate and training their employees to use more IT advanced tools and to acquire more knowledge from different sources, which if practiced successfully, will support the organizational learning environment. However, the research is limited to Carnival Cruise Lines in Miami, FL, USA, only. Future research may examine studied variables in another industry, context.

Keywords: Information Technology (IT), IT tools, Knowledge Management, PLS-SEM, Moderating effect.

Metaverse in the context of education in the Game Art program at the Faculty of Contemporary Arts

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Abstract

Metaverse, or the Metaverse concept, represents a virtual space conceptually separated from the real physical world. In this three-dimensional online environment, users are represented by digital avatars and can interact with each other. The idea of a virtual space that functions as an extension of our reality, where users can meet, communicate, and act as their digital alter egos, represents a deep integration of technology into our everyday lives. The concept of the Metaverse supports a phenomenon of modern society by "shifting everyday life into the online sphere, ultimately leading to the dominance of digital media logistics throughout society" (Kalpokas, Kalpokienė, 2023). The terminology and definitions of this fascinating concept are still evolving, with various interpretations being considered in academic circles. On one hand, there are definitions describing it as a complex network of virtual worlds and augmented reality (Ritterbusch, Teichmann, 2023), while others describe it as a three-dimensional internet populated by living people (Gilad, 2022). Despite different definitions, there is a general consensus on the benefits of its implementation, which include communication, interaction, real-time content creation and sharing capabilities. Despite being still in the development phase, the Metaverse represents an exceptionally interesting concept with broad potential applications across various spheres of life. Different definitions and interpretations of the Metaverse illustrate how open this concept is to diverse perspectives and applications. While some see it as a platform for entertainment and social interaction, others view it as a potential tool for business, medical purposes, education (Gao, 2022), art, and culture (Hu et al., 2022). A key question frequently asked is how the infrastructure will develop and how issues of privacy, security, and accessibility will be addressed in this new digital space (Kalpokas, Kalpokienė, 2023; Shen et al., 2023).

Given the graphic demands, scalability challenges, and optimisation issues, most users opt to create interactive 3D worlds on existing infrastructures such as the online social game Second Life, one of the most well-known Metaverses, the popular game Minecraft with expansive worlds for players to explore, and the platform Roblox that enables creation and sharing of 3D worlds with the community. Although these gaming options are highly popular due to their cloud-based infrastructure, which greatly facilitates creation and interaction, creating a world remains a significant challenge. In the Game Art program at the Faculty of Contemporary Arts, we are developing elements that constitute the Metaverse universe. In practice, we apply various areas used in creating and enhancing Metaverse systems, not only in the context of video games but also for various other purposes. For example, in the Level Design course, students are introduced to the Unreal Engine 5 platform for creating virtual worlds and spaces. Unreal Engine, as one of the most well-known open-source software, is used not only in gaming but also in the automotive industry, film, architecture, and other fields. In addition to environment design tools, it offers programming capabilities in C++, facilitating connection with the

decentralised web 3.0 network and use of blockchain technology. Alongside courses in 3D modelling and character and asset animation, we are creating a comprehensive body of work for the virtual world, in this case, the Metaverse. It is essential for computer performance and requirements to be adapted to each configuration, including mobile platforms. In addition to focusing on optimising system elements crucial for seamless user interaction, we aim to create authentic, visually appealing, and creative worlds as a whole to stand out in the highly competitive creative industry market, contributing to the creation of diverse 3D platforms and isolated environments for commercial, entertainment, social, and educational purposes.
Given that the Faculty of Contemporary Arts is characterised by a blend of art and technology, the aim of our research is to analyse and apply Metaverse technology from an artistic perspective, enabling exposure and global sales of visual and audio artworks without physical space constraints. Academic discussions have been held regarding the development of digital identity galleries (Giannini, Bowen, 2023). It is worth noting that the COVID-19 pandemic acted as a catalyst for the increased online presence of galleries and museums, offering alternative virtual experiences (Cotter et al., 2022). Furthermore, augmented realities (e.g., virtual reality and augmented reality) and artificial intelligence provide modern artists with new techniques and tools to show their creations to audiences on 3D digital platforms. Additionally, the use of Non-Fungible Tokens (NFTs) further empowers (digital) artists in visual and audio media, enabling them to prove ownership and protect their copyrights, which is crucial in the art world. Therefore, the ability to authenticate copyrights and sell digital art as unique assets are of enormous importance in the art industry and NFTs have opened new avenues for artists to monetise their talent and creativity (Damodaran, 2023). For the case study of this research, a 3D VR art gallery has been developed showing artworks by students from the Game Art program at the Faculty of Contemporary Arts. One of the key components of these systems is the application of VR technology, which is already widely used in such contexts. The current VR project we are working on has generated significant interest from people who want to experience the technology more closely. It is crucial that the content of resources and space in the VR environment be optimised and that various modelling and object animation techniques be applied. Without such approaches, it is not possible to create a platform that functions smoothly, especially with multiple users simultaneously present in one place. The virtual gallery we are creating represents just one step towards developing more complex content and ideas within the project.

Therefore, this research primarily focuses on exploring the interconnectivity of technologies related to the Metaverse, digital art, artificial intelligence, and NFTs. Based on this, the following research questions are posed: How can digital art be integrated into Metaverse platforms to enhance user experience? What are the potential benefits and challenges that the Metaverse offers to artists compared to traditional methods of exhibiting art? How will the perception of digital art change in the context of the Metaverse, which enables interactivity and immersion? How can the Metaverse impact the distribution and promotion of digital art compared to conventional gallery and exhibition spaces?

The methodology to answer these research questions involves synthesising existing literature, conducting a survey, and a case study. The survey will consist of 20 questions related to understanding the concept of the Metaverse, NFTs, blockchain technology, WEB 3.0, artificial intelligence, and digital art asset creation and environment. Students in the first, second, and third years of the Game Art program at FCA will participate in the survey to assess the contemporary technology needs of the program. The research presented in this paper will be useful for individuals wishing to explore the Metaverse for artistic purposes and develop virtual galleries and worlds. This

research contributes a systematic review and methodological approach for gathering primary data, focusing on a specific example of concrete use that can serve as a basis for future research.

Keywords: Metaverse, NFT, blockchain technology, WEB 3.0, artificial intelligence, digital art, assets, VR, 3D.

References:

- Damodaran, A. (2023). From non-fungible tokens to metaverse: Blockchain-based inclusive innovation in arts. Innovation and Development, 1–20.
- Cotter, K., Crone, D., Rodriguez-Boerwinkle, R., Boerwinkle, M., Silvia, P., & Pawelski, J. (2022). Examining the flourishing impacts of repeated visits to a virtual art museum and the role of immersion. Behavioral Sciences, 12(12), 500.
- Giannini, T., & Bowen, J. P. (2023). Global Cultural Conflict and Digital Identity: Transforming Museums. Heritage, 6(2), 1986–2005.
- Edelman, G. (2022). How to Build a Better Metaverse. *Wired.*
- Ritterbusch, G. D., & Teichmann, M. R. (2023). Defining the metaverse: A systematic literature review. IEEE Access, 11, 12368–12377.
- Kalpokas, I., & Kalpokienė, J. (2023). Regulating the Metaverse: A Critical Assessment. Routledge.
- Shen, J., Zhou, X., Wu, W., Wang, L., & Chen, Z. (2023). Worldwide overview and country differences in metaverse research: A bibliometric analysis. Sustainability, 15(4), 3541.
- Gao, Y., & Gao, L. (2022). Realization of music-assisted interactive teaching system based on virtual reality technology. Occupational Therapy International, 2022.
- Hu, X., Lai, Y., Zhao, D., Tong, F., Hu, Y., & Li, Y. (2022). Ceramic Painting and Traditional Cultural Element Fusion Composition Design Based on Virtual Reality. Applications of Nanomaterials and Nanotechnology in Engineering, Environment and Life Sciences, Volume 2022, Article ID 3781448.
- Kalpokas, I., & Kalpokienė, J. (2023). Regulating the Metaverse: A Critical Assessment. *Routledge*.

The Convergence of Machine Learning and Robotics: Innovations and Implications for Future Technologies

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Abstract

The integration of machine learning (ML) with robotics has heralded a new era in automation and intelligent systems. This article reviews the current state of machine learning applications within the field of robotics, discusses key innovations, and explores potential future developments and challenges. By analyzing recent advancements and case studies, this study aims to highlight how ML enhances robotic capabilities in perception, decision-making, and adaptability, leading to more autonomous and efficient systems.

1. Introduction

Robotics and machine learning are two rapidly evolving technologies that have significantly impacted various sectors, including manufacturing, healthcare, and services. As robots become more integrated into everyday tasks, the need for advanced decision-making and adaptability increases. Machine learning offers robust solutions by enabling robots to learn from data, improve their processes, and execute complex tasks with greater accuracy and efficiency.

2. Machine Learning in Robotics

Robotics and machine learning are two of the most transformative technologies reshaping multiple industries, from manufacturing and healthcare to services and logistics. Their integration marks a significant shift towards creating more autonomous, intelligent systems capable of complex behaviors and decision-making processes. As robots become more ingrained in our daily activities and operational tasks, their potential to significantly enhance productivity, accuracy, and innovation becomes increasingly evident.

Machine learning, with its ability to learn from data, adapt to new scenarios, and improve over time, is particularly suited to enhancing robotic systems. This technology allows robots not only to perform predefined tasks but also to adapt to changing environments and solve unforeseen challenges. The application of advanced machine learning algorithms enables robots to perceive their surroundings, make data-driven decisions, and learn from the outcomes, leading to continuous improvement in performance.

Moreover, the synergy between robotics and machine learning is paving the way for the development of "smart" robots. These robots are capable of behaviors that were previously thought to be exclusively human, such as contextual understanding, natural language processing, and complex

problem-solving. This leap in capability is not just enhancing the efficiency of existing processes but is also enabling the deployment of robots in entirely new areas where nuanced understanding and adaptability are critical.

The rise of connected devices and the Internet of Things (IoT) further amplifies the impact of robotic systems enhanced by machine learning. In this connected ecosystem, robots can share insights and learn from each other, dramatically accelerating the learning process and enabling a collective intelligence that can be leveraged to optimize entire systems rather than individual units.

This confluence of robotics and machine learning is not without challenges, however. Technical complexities, ethical considerations, and the need for significant investment in skills and infrastructure pose hurdles to adoption. Nevertheless, the potential benefits promise to revolutionize how we work, manufacture, heal, and interact with the technological world around us. As we stand on the brink of this new era, it is crucial to navigate these challenges thoughtfully to fully realize the transformative potential of machine learning-enhanced robotics.

Machine learning, particularly deep learning, has become instrumental in robotics. Techniques such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs) are extensively used for tasks involving visual recognition and sequential decision-making. Reinforcement learning (RL) has also been crucial in training robots to perform tasks through trial and error, enhancing their ability to navigate and manipulate objects in dynamic environments.

- Industrial Automation: Robots equipped with ML algorithms optimize production lines, performing tasks such as assembly, painting, and quality control with unprecedented precision.
- Healthcare Robotics: In surgical procedures, robots use ML to analyze data in real-time, assisting surgeons with enhanced precision and adaptability.
- Service Robots: From customer service bots to personal assistants, ML enables robots to understand and respond to human emotions and verbal commands.

3. Innovations at the Intersection

Cognitive robotics focuses on imbuing robots with human-like processing abilities. This includes understanding and reasoning about their environment, learning from experiences, and making decisions that optimize their chances of success based on predictive analytics powered by machine learning.

Cobots are designed to work alongside humans, learning from human actions and responding to changes in their environment. Machine learning algorithms help these robots adapt their behaviors to ensure safety and efficiency in shared workspaces.

4. Challenges and Future Directions

Integrating ML with robotics presents technical challenges, including data scarcity, the need for real-time processing, and the development of models that can generalize across different tasks and environments. Solutions such as transfer learning, simulation environments, and unsupervised learning techniques are being explored to overcome these issues.

As robots become more autonomous, ethical questions regarding their role in society, their decision-making processes, and their interaction with humans become increasingly important. Addressing these concerns requires clear guidelines and robust ethical frameworks.

5. Conclusion

The convergence of machine learning and robotics is transforming traditional robotic systems into intelligent agents capable of performing tasks with a level of autonomy previously unattainable. This evolution promises substantial benefits across various industries but also poses significant challenges that need to be addressed to ensure these technologies contribute positively to society.

References

1. Alpaydin, E. (2020). Introduction to Machine Learning (4th ed.). MIT Press.
2. Murphy, R.R. (2019). Introduction to AI Robotics (2nd ed.). MIT Press.
3. Russell, S., & Norvig, P. (2016). Artificial Intelligence: A Modern Approach (3rd ed.). Pearson.
4. Sutton, R.S., & Barto, A.G. (2018). Reinforcement Learning: An Introduction (2nd ed.). MIT Press.

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Application of creators intelligence in the business environment

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Abstract:
In today's global business environment, innovation, productivity, and competitiveness are key success factors for organizations of all sizes and industries. In this context, Creators intelligence is becoming an increasingly important resource for business development. Creators intelligence is not just the ability to generate new ideas, but also the capacity to nurture and sustain authentic creation, innovation, and boundary-pushing, new values, through a path that connects known and unknown elements. In this way, shores are connected, and natures and origins of knowledge are intertwined. By this approach, we engage intelligence and smartness, wisdom and knowledge, as well as many other aspects, in a more foundational, accurate manner.

In this extended abstract, we explore how the application of Creators intelligence and its technology, namely programs, tools, and skills, can enhance innovativeness, productivity, and competitiveness in business organizations, offering insights into the core mechanisms and potential benefits of this approach, with an emphasis on the importance of interdisciplinarity and diversity in the workplace.

Keywords: innovation, Creators intelligence , technologies

Introduction:

In a time of continuous mutation and transience, what now dominates is a new dimension and a greater need for overall care of the soul and body, namely, for the development of spiritual intelligence. This turning point does not exclude coexistence with technology and the most modern models of expression; on the contrary. However, the digital and technological revolution deepens the need for a return to nature, to the natural. Returning to the ancient is a subconscious need to be guided by whatever tools to internal dialogue and to aspire towards an ethereal state of consciousness. Parallel digital worlds, artificial intelligence, and contemporary media are perfect airports for the landing of a completely new individual, ready to easily regulate new global flows. New times bring new philosophical turning points and new Shamans.

In a time of continuous change, the digital and technological revolutions have not only reshaped our tools but also emphasized the need for a holistic approach to creativity and innovation. Guilford's Structure of Intellect model posits that Creators intelligence is crucial for producing a variety of potentially useful solutions to a problem (Guilford, 1967). Similarly, Sternberg and Lubart's Investment Theory suggests that Creators intelligence is the ability to invest in low-value ideas initially to turn them into high-value innovations (Sternberg & Lubart, 1995).

Innovation and Productivity in Business (Analysis of Innovation through Creators intelligence)

Creators intelligence plays a pivotal role in the contemporary business landscape, fostering innovation, productivity, and competitiveness. According to Amabile (1996), organizational innovation through creativity involves the combination of expertise, creative thinking skills, and motivation. Furthermore, Florida (2014) argues that cultivating creativity in a business environment not only enhances productivity but also drives economic growth by attracting and retaining talented individuals.

Creators intelligence encourages an environment where novel ideas can flourish. Csikszentmihalyi (1996) emphasizes that creativity results from a synergy between individual skills and the societal or cultural context, which businesses can harness by fostering diverse and dynamic work environments. Linking to Hennessey and Amabile's (2010) findings, the organizational support for autonomy and freedom encourages innovative outputs in business settings.

Technologies that enhance Creators intelligence are becoming fundamental in optimizing organizational productivity. According to a study by Shalley, Zhou, and Oldham (2004), technology that supports creative processes significantly enhances the efficiency and novelty of outputs in organizational settings. The integration of AI and machine learning tools can also provide customized insights that streamline decision-making processes (Kaplan and Haenlein, 2019).

Finding New Solutions for Business Challenges:

Creators intelligence fosters innovative thinking, creativity, and craftsmanship as an integral part of the creation process among employees. Through the ability to merge different ideas and perspectives, Creators intelligence enables teams to generate new ideas and concepts that, with parallel nurturing and implementation of evolutionary legacies, can revolutionize products, services, or business processes. This ability not only enhances organizations' competitiveness in the market but also creates an atmosphere of continuous learning and innovation within organizations. By integrating different disciplines and areas of expertise, organizations can develop holistic approaches to problems and more effectively tackle challenges that require diverse perspectives and skills. Enhancing communication and collaboration between different departments and teams further fosters creative thinking and innovation.

Creators intelligence technology also contributes to increased productivity in business organizations. By encouraging teamwork, collaboration, and innovative thinking, Creators intelligence enables more efficient utilization of resources and maximum use of personal affinities, key values, and talents within the organization. This approach not only increases employee productivity but also creates a positive work atmosphere and a sense of belonging to the organization. Allowing employees to explore their passions and interests in the workplace boosts their motivation and engagement, further contributing to productivity and creativity within the organization. Moreover, it is important to emphasize the significance of providing support for a balance between employees' work and personal lives, contributing to their well-being and long-term productivity.

Creators intelligence enables organizations to find new and innovative ways to solve business challenges. By encouraging experimentation, risk-taking, and embracing change, Creators intelligence allows organizations to adapt to rapid changes in the business environment. This approach enables any type of organization to be agile, flexible, and ready for future challenges, creating a platform for long-term growth and sustainability. Calming the mind and giving employees space to engage in

activities that inspire them outside the work environment also contributes to creating a creative and productive work atmosphere. Promoting a culture of openness, where different perspectives and ideas are valued, is crucial for successfully finding new solutions for business challenges.

Dyer, Gregersen, and Christensen (2011) highlight the role of 'disruptive innovation' in business growth, where Creators intelligence can lead to the development of groundbreaking products and services. The ability to adapt and innovate is further supported by West and Farr's (1990) theory on the psychological processes of innovation in the workplace.

Conclusion:

In light of the increasing need for innovation, productivity, and competitiveness, Creators intelligence becomes a key success factor for business organizations. By fostering authentic, advanced, solitary, innovative thinking, increasing productivity, and finding new solutions for business challenges, Creators intelligence enables organizations to achieve sustainable growth and development in a dynamic business environment. Integrating interdisciplinarity, supporting diversity, and promoting personal development of employees are key elements of the successful application of Creators intelligence in the business context. Additionally, it is important to emphasize the significance of raising awareness about the balance between work and personal life. Maintaining a healthy balance between professional obligations and personal interests is crucial for the long-term well-being of employees and the overall success of the organization. By implementing business policies that promote work-time flexibility, support for family obligations, and resources for personal development, organizations can build a culture that fosters balance and empowers their employees to achieve their full potential both at work and in life outside of it. This integrated approach to Creators intelligence and its applicable technology creates space for increasingly solid foundations toward a balance between work and private life, laying the groundwork for the holistic progress of organizations and their members.

As highlighted by Pink (2005), the modern economy requires a symbiotic relationship between creativity and practical intelligence. This dynamic is essential for sustaining long-term growth and adapting to evolving market demands. Organizations that effectively integrate Creators intelligence into their strategies benefit from a robust competitive edge and improved employee satisfaction and engagement.

References:

1. Amabile, T. (1996). Creativity in Context. Boulder, CO: Westview Press. Retrieved from https://www.hbs.edu/faculty/Pages/item.aspx?num=268 (11.05.2024).
2. Csikszentmihalyi, M. (1996). Creativity: Flow and the Psychology of Discovery and Invention. New York: HarperCollins. Retrieved from: https://digitalauthorship.org/wp-content/uploads/2016/01/csikszentmihalyi-chapter-flow-and-creativity.pdf (11.05.2024).
3. Dyer, J., Gregersen, H., & Christensen, C. M. (2011). The Innovator's DNA: Mastering the Five Skills of Disruptive Innovators. Boston, MA: Harvard Business Review Press.
4. Florida, R. (2014). The Rise of the Creative Class—Revisited: Revised and Expanded. New York: Basic Books.
5. Guilford, J.P. (1967). The Nature of Human Intelligence. New York: McGraw-Hill.
6. Hennessey, B. A., & Amabile, T. M. (2010). Creativity. Annual Review of Psychology, 61, 569-598.
7. Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. Business Horizons, 62(1), 15-25.
8. Pink, D. H. (2005). A Whole New Mind: Why Right-Brainers Will Rule the Future. New York: Riverhead Books.
9. Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? Journal of Management, 30(6), 933-958.
10. Sternberg, R. J., & Lubart, T. I. (1995). Defying the Crowd: Cultivating Creativity in a Culture of Conformity. New York: Free Press.
11. West, M. A., & Farr, J. L. (1990). Innovation and Creativity at Work: Psychological and Organizational Strategies. Chichester: Wiley.

Technology of Creators Intelligence as the Key to Personal Development and Well-being: Its Positive Impact on Emotional, Mental, Physical, and Spiritual Harmony

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Introduction

In today's dynamic and demanding world, creators intelligence and its technology are becoming increasingly significant factors in achieving personal development and well-being. This aspect of intelligence, which enables individuals to generate new ideas, solve problems insightfully and innovatively, and create original works, is gaining importance in both professional and personal life. This paper explores how developing creators intelligence can positively impact an individual's emotional, mental, physical, and spiritual well-being, emphasising the importance of developing key personal skills and the interconnectedness and interdependence of all areas of life.

Emotional Well-being:

The creative process is not only a means of expressing creative abilities but also a way to deal with one's own feelings, emotions, actions, and reactions. Through creative and artistic expression or problem-solving, an individual can channel their emotions, and reactions, explore their nature, and find a constructive outlet. This release of emotional blockages and overcoming obstacles not only reduces stress but also enhances emotional intelligence, leading to a deeper understanding of oneself and one's needs, as well as a greater readiness, maturity, and agility in understanding others and the world around us. Examples like journaling, painting, or playing instruments can serve as illustrations of ways to express emotions and promote emotional well-being.

Mental Well-being:

The creative process and its technologies require and offer opportunities to think outside the usual frameworks and open minds to new ideas and perspectives, thereby providing a new quality and meaning to life. This stimulates the development of visionary thinking, divergent thinking abilities, and mental flexibility, processing our developments and achievements in a multidimensional manner. Through activities like writing, painting, designing, and many others suited to individual affinities and inclinations, people exercise their cognitive abilities and create new neural pathways, improving their multidimensional sharpness, agility, and capacity. For example, insightful and original problem-solving can encourage individuals to view situations from different angles, develop unexpected insights and generate authentic and original solutions applicable to all areas of life.

Physical Well-being:

Although the creative process can primarily be a mental activity, it can also have a positive impact on an individual's physical well-being. Deeply immersed in the creative process, a person can experience a state called "flow", where the sense of time and space is lost. This state of immersion can reduce stress levels, relax the body, and improve overall well-being. For instance, engaging in activities such as dancing, gardening, or creative therapy can help release tension and promote physical well-being.

Spiritual Well-being:

The creative process can also contribute to an individual's spiritual well-being, fostering a sense of connection with the universe or a deeper meaning of existence. Through creative work, an individual can explore their inner worlds, develop their intuition, and connect with their spiritual essence. This can lead to feelings of peace, tranquillity, and fulfilment, encouraging individuals to live in accordance with their spiritual values and goals. At the same time, spiritual well-being is directly interconnected and dependent on all areas and aspects of life as a whole.

Development of Personal Skills:

Creators intelligence stimulates the development of a wide range of personal skills, including self-confidence, mental flexibility, persistence, and resilience to failure. Through the process of creation, individuals constantly grow, learn, and practice facing challenges, accepting change, and exploring new possibilities. These skills are crucial for success in all areas of life, from career to personal relationships. Examples like managing projects or artistic expression can serve as ways to develop skills such as time management, teamwork, and problem-solving.

Conclusion

Developing the technology of creators intelligence can have a profound and multifaceted positive impact on an individual's personal development and well-being. Its tools, techniques, and approach models are beneficial and also very easily and practically applicable. Of course, time is necessary to acquire new habits and a new form of conditioning. Through emotional release, mental stimulation, physical relaxation, spiritual purification, and the development of key personal skills, creators intelligence becomes a key factor for achieving harmony and satisfaction in life by awakening a new perspective and a new approach. Therefore, promoting creative thinking and supporting innovative visionary expression and living models should be priorities in education and society as a whole.

Urbanisation: Impacts and Sustainable Practices

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Abstract

Urbanisation is a defining phenomenon of modern civilisation, marked by the migration of populations from rural to urban areas and the consequent growth of cities. While it is associated with economic development and improved living standards, urbanisation also brings complex challenges that affect environmental, social, and economic sustainability. This article explores the multifaceted impacts of urbanisation, discusses current issues facing urban areas, and examines sustainable practices that can mitigate adverse effects.

Introduction

Urbanisation is one of the most significant global trends of the 21st century. As of 2020, more than 55% of the world's population resides in urban areas, a number that is expected to increase to 68% by 2050 (United Nations, 2019). This rapid urban growth, while a sign of economic growth, poses significant sustainability challenges that need to be addressed to ensure the long-term viability of urban environments. Embracing sustainable architecture can significantly reduce the environmental impact of urban areas.

Public Transport Systems: Developing efficient and accessible public transportation systems can reduce reliance on personal vehicles, decrease emissions, and improve urban mobility.

Urban Green Spaces: Preserving and expanding urban green spaces not only helps in carbon sequestration but also improves the quality of life for city residents.

Smart City Technologies: The use of smart technologies in urban management, from traffic control to energy management, can enhance efficiency and sustainability.

The Impact of Urbanisation

Environmental Impacts: Urbanisation significantly alters the natural landscape. The expansion of urban areas often leads to habitat destruction, increased pollution, and altered climate patterns. Cities consume a large portion of natural resources, which leads to higher carbon footprints and significant environmental degradation.

Social Impacts: While urbanisation can improve access to services, education, and employment, it also exacerbates social inequalities. The rapid growth of cities often leads to inadequate housing and services, creating sprawling slums and increasing socio-economic disparities.

Economic Impacts: Urban areas are engines of economic growth, contributing a disproportionate share of the GDP in many countries. However, the economic benefits of urbanisation are not always evenly distributed, leading to pockets of poverty and underinvestment in public infrastructure.

Gentrification: The Double-Edged Sword of Urban Development

Gentrification represents a significant aspect of urbanisation that transforms urban environments, bringing renewal and economic development, but at the same time, it potentially leads to social injustices. In the process of gentrification, renovated urban spaces attract wealthier residents, which leads to an increase in property prices and living standards. This phenomenon can result in the displacement of existing, often less affluent residents, changing the character of the community and increasing social polarisation.
Studying gentrification helps in understanding how urbanisation can improve the quality of life while simultaneously creating new challenges, thus requiring a balanced approach to planning and developing urban policies. This process illustrates the complexity of urban challenges and underscores the need for inclusive development strategies that protect and support existing residents while simultaneously attracting new investments (Lees, Slater, & Wyly, 2013); (Smith, 1996); (Atkinson & Bridge, 2005).

Current Urban Issues

Overcrowding: One of the immediate consequences of urbanisation is overcrowding. High population density can strain infrastructure, decrease the quality of life, and increase health risks.

Traffic Congestion: Urban areas often face significant challenges in managing vehicular traffic. Congestion leads to increased emissions, wasted time, and higher stress levels among residents.

Waste Management: Effective waste management is a critical issue for urban centres. Increased consumption patterns typical of urban life result in significant waste generation, requiring sophisticated management strategies to avoid public health crises and environmental impact.

Sustainable Urban Practices

Green Architecture: Implementing green building standards and promoting environmentally friendly construction techniques to mitigate the ecological impact of urban development.

Conclusion

Urbanisation is an irreversible trend tied closely to human development. However, its sustainability depends on the adoption of comprehensive strategies that address environmental, social, and economic challenges. Cities of the future must embrace innovative solutions and sustainable practices to remain vibrant and livable.

References:

1. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanisation Prospects: The 2019 Revision, Online Edition.
2. Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A Meta-Analysis of Global Urban Land Expansion. PLOS ONE, 6(8), e23777. https://doi.org/10.1371/journal.pone.0023777
3. Newman, P., Beatley, T., & Boyer, H. (2017). Resilient Cities: Overcoming Fossil Fuel Dependence. Island Press.
4. Gill, S. E., Handley, J. F., Ennos, A. R., & Pauleit, S. (2007). Adapting cities for climate change: The role of the green infrastructure. Built Environment, 33(1), 115–133.
5. Ratti, C., & Claudel, M. (2016). The City of Tomorrow: Sensors, Networks, Hackers, and the Future of Urban Life. Yale University Press.
6. Newman, P., Beatley, T., & Boyer, H. (2020). Resilient cities: Overcoming fossil fuel dependence. 2nd Edition, Island Press
7. Glaeser, E. L. (2011). Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier. Penguin Press.
8. Batty, M. (2013). The New Science of Cities. MIT Press.
9. Lees, L., Slater, T., & Wyly, E. K. (2013). Gentrification. Routledge.
10. Smith, N. (1996). The New Urban Frontier: Gentrification and the Revanchist City. Routledge.
11. Atkinson, R., & Bridge, G. (Eds.). (2005). Gentrification in a Global Context: The New Urban Colonialism. Routledge.

Artificial Intelligence as a Driver of Intelligence in Gifted Students

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Abstract

The application of artificial intelligence in the educational system has contributed to the accelerated development of teachers' capabilities to approach students more individually, to improve the processing and presentation of teaching units, to single out strong or weak segments of understanding of the material during their class for all students present and to evaluate in an easier but more precise way students' knowledge, through statistics that provide them with relevant and useful data that point them to their own progress, as well as the progress of the students. The beneficial impact of artificial intelligence is particularly emphasised with gifted students and those receiving additional instruction.
The research in this scientific paper aims to show how artificial intelligence can be used as a driver of intelligence in gifted students through practical examples. Data collection techniques applied in the study include systematic observation and observation in experimental conditions, where achievement results were measured over continuous time intervals for children already identified as gifted. It has been proven that the use of artificial intelligence through certain educational applications/software brings positive results for gifted students by influencing the development of certain skills in using their own intelligence. This includes increasing motivation and focus, guiding their thought processes towards finding solutions/goals, strengthening cognitive skills such as reasoning and working memory, developing divergent thinking by considering different possibilities and thinking outside the usual framework, improving the development of a personal algorithm in problem-solving, planning and forecasting, and research.

The application of artificial intelligence through educational applications and educational quizzes in the educational system requires thinking ahead, thinking procedurally, thinking logically, thinking concurrently, teamwork in certain tasks, creativity in problem-solving, ethical and moral approaches, adapting methodological approaches and pedagogy to the age and knowledge level of students, teamwork and cooperation between teachers and associates, and artificial intelligence experts.

Keywords: *intelligence, artificial intelligence, educational applications, education, thinking.*

Examining the Influence of Foot Health on Motor Development in Preschool Children: A Comparative Study

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Abstract:

Early childhood is a critical period for physical and motor development, with foot health playing a significant role in this process. This study aims to explore the relationship between foot status and motor abilities in preschool-aged children, focusing on how different foot health conditions affect motor performance.

Objective

The primary objective of this study is to determine the differences in motor skill manifestation among preschool children with varying foot statuses. The study specifically examines whether children with normal, high-arched, or flat feet exhibit significant differences in their motor skills.

Literature review

Foot posture is a crucial factor in both standing and walking [1,2]. In both children and adults, a healthy foot maintains contact at three key points: the heel bone, the joint of the first metatarsal, and the fifth metatarsal bone. These points form the basis of the longitudinal and transverse arches of the feet. The longitudinal arches include the medial and lateral arches, while the transverse arches consist of the posterior and anterior (metatarsal) arches [3]. These arches are designed to be flexible and adaptable, with the tendons and joints between the bones absorbing shock during movement. Modern lifestyles, however, have significantly altered the original function of the human foot. All healthy infants are born with flexible flat feet, with the medial longitudinal arch developing over the first ten years of life [4]. This arch continues to rise as children age [5].

The foot health of preschool children is a contentious issue. Parents often become concerned, and pediatricians may prescribe treatments without sufficient diagnostic evidence [6]. The controversy primarily revolves around defining flat feet in children. Literature reports varying prevalence rates of pediatric flat foot, ranging from 3% to 15% [7]. For instance, a study of 835 children found that the incidence of a reduced longitudinal arch dropped from 54% in three-year-olds to 24% in six-year-olds [6]. This aligns with other studies that show a continuous decrease in flat feet from ages 4 to 10 [8,9]. Further complicating the issue are the various diagnostic methods for assessing foot status, including somatotopic methods in static and dynamic conditions, scanner-generated footprints, ink prints, radiography, clinical tests, and baropodometry [6].

Preschool age is a sensitive developmental period essential for acquiring and honing motor skills. This stage, ranging from 4 to 7 years, is when children's motor structures develop based on both genetic and external factors influencing overall growth and development [13]. During this time,

children's motor abilities are general rather than specialized, as they react with their whole bodies to perform motor tasks [14,15]. This age is marked by a distinct developmental integrity, where the development of one domain, such as physical or cognitive skills, influences other domains. Motor skills are particularly vital as they stimulate various developmental processes that positively impact overall growth. Early movement experiences, appropriate teaching methods, adequate space, and positive reinforcement from parents and educators facilitate optimal motor development.

The relationship between foot health and motor abilities in preschool children remains underexplored in scientific literature. This study aims to determine whether preschool children with different foot statuses—specifically those with normal, high-arched, or flat feet—exhibit statistically significant differences in motor test results.[6].

Methods

This comparative observational study included 202 preschool children aged 3.9 to 6.5 years who participated in regular sports programs. The children underwent anthropometric measurements to determine BMI, motor skills tests (20m run, standing broad jump, backwards polygon, seated forward bend, plate tapping, sit-ups, and bent arm hang), and foot status assessments. The sample consisted of 153 normally fed children, 6 undernourished, 30 overweight, and 13 obese children. Foot status was categorized into normal arch, high arch, and flat feet using baropodometric measurements. Nonparametric tests (Kruskal–Wallis and Mann–Whitney U tests) were used for data analysis at a significance level of $p \leq 0.05$.[6].

Results

The analysis revealed that 30 (14.9%) children had normal arch feet, 90 (44.6%) had high-arched feet, and 41 (20.3%) had flat feet. There was a statistically significant difference between the groups in most motor tests, with $p \leq 0.01$ for most assessments and $p \leq 0.05$ for sit-ups and the bent arm hang. No significant difference was found in the seated forward bend test. Children with high-arched feet performed better in all motor tests compared to those with normal and flat feet.[6].

Discussion

The findings suggest that foot health significantly impacts motor skill development in preschool children. High-arched feet are associated with better performance in motor tasks, possibly due to better overall stability and function. Early detection and intervention for foot health issues could enhance motor development and physical activity in young children. Regular foot health assessments and appropriate interventions, such as physical therapy and corrective footwear, are recommended to support optimal motor development.

Conclusion

This study underscores the importance of foot health in the motor development of preschool children. Children with high-arched feet show superior motor skills compared to their peers with normal or flat feet. Early interventions to address foot health issues can lead to better motor outcomes and overall physical development in children. Further research is needed to explore the long-term benefits of such interventions and to establish standardized protocols for foot health assessments in early childhood settings.

Keywords Foot health, motor development, preschool children, observational study, early intervention

References

1. Al Abdulwahab, S. S., & Kachanathu, S. J. (2015). The effect of various degrees of foot postures on standing balance in healthy adult population. Somatosensory & Motor Research, 32(4), 172–176. https://doi.org/10.3109/08990220.2015.1046100
2. Jonely, H., Brismée, J. M., Sizer, P. S., Jr., & James, C. R. (2011). Relationships between clinical measures of static foot posture and plantar pressure during static standing and walking. Clinical Biomechanics, 26(9), 873–879. https://doi.org/10.1016/j.clinbiomech.2011.05.010
3. Butković, I. (2009). Povrede i Oboljenja Stopala i Skočnog Zgloba. Beograd, Serbia: Naučna KMD.
4. Rodriguez, N., & Volpe, R. G. (2010). Clinical diagnosis and assessment of the pediatric pes planovalgus deformity. Clinics in Podiatric Medicine and Surgery, 27(1), 43–58. https://doi.org/10.1016/j.cpm.2009.08.002
5. Müller, S., Carlsohn, A., Müller, J., Baur, H., & Mayer, F. (2012). Static and dynamic foot characteristics in children aged 1–13 years: A cross-sectional study. Gait & Posture, 35(3), 389–394. https://doi.org/10.1016/j.gaitpost.2011.10.361
6. Kojić, M.; Protić Gava, B.; Bajin, M.; Vasiljević, M.; Bašić, J.; Stojaković, D.; Ilić, M.P. The Relationship between Foot Status and Motor Status in Preschool Children: A Simple, Comparative Observational Study. Healthcare 2021, 9, 936. https://doi.org/10.3390/healthcare9080936

The Importance of Emotional Intelligence (EI) in Creative Processes of the Accelerated Digital Revolution

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Abstract

Emotional intelligence (EI) as the ability to recognize, understand, and manage one's own and others' emotions, is becoming key to successfully utilizing and integrating new technologies. As such, it plays an important role in the creative processes of the accelerated digital revolution, because it can enhance human interaction with advanced technologies and ensure ethical standards in the digital future that lies ahead of us.

Introduction

The accelerated digital revolution is transforming all aspects of our lives daily, including the way we work, communicate, and create. In the areas of Creative Industries, it has brought significant changes in transforming the way visual communication and artistic content is created, distributed, and consumed. Technologies such as artificial intelligence (AI), augmented reality (AR), virtual reality (VR) and the Metaverse, are bringing revolutionary changes and enabling new forms of creativity, but at the same time opening up challenges regarding the human aspects of interacting with technology. Emotional intelligence (EI), as the ability to recognize, understand, and manage our own and others' emotions, is becoming an indispensable link in the advanced use, development, and integration of new technologies in everyday life and work. While AI enhances our ability to rapidly process and analyze vast amounts of data and content, EI becomes key in interpreting the boundless nuances of human experience and preserving meaningful interpersonal relationships. In that context, EI becomes the guarantor of ensuring that technological development will not only advance the technical aspects of creative processes, but will also retain the human component that makes creative processes unique, authentic, and emotionally resonant.

Emotional Intelligence and Creativity

Creative industries, such as film, music, design and advertising, are increasingly using AI technologies to enhance their processes. Since the essence of creativity lies in understanding and expressing human emotions, the integration of EI with AI in these industries enables machines to better understand creative processes and contribute to creating content that is emotionally deeper and more powerful.

Jony Ive, Chief Designer at Apple, emphasized the importance of emotional connection with the

products he creates. Apple teams use empathy to understand the needs and desires of users, resulting in products that are intuitive and emotionally anticipatory. Specifically, the development of the iPhone was preceded by extensive in-depth research, analysis and understanding of user interaction with the device, which in addition to functionality includes an emotional aspect of connection with the brand.

"IDEO" is a leading design company that uses AI innovations in design. The key to their success is in the "Design Thinking" approach based on emotional intelligence, where all solutions must be focused on human needs. "Empathy is not just a tool, but a way of being in the design process. Our mission is to use technology to design products and services that are not only functional but deeply meaningful to people." (Tim Brown, Chair of IDEO, 2009).

"Pixar Animation Studios" is known for its aesthetically and technically perfect, but also emotionally powerful animated films (Toy Story, Monsters, Wall-E, Up, Inside Out). The Pixar creative team emphasizes the importance of and insists on integrating EI with AI in each of their projects. "The best way to predict the future is to invent it, but to do that, we must understand the people who will use our products." (Ed Catmull, Founder of Pixar, 2014).

"Soul Machines" is a company that develops AI avatars with highly developed emotional intelligence, which can communicate with users in a human way. They use EI to create empathetic interactions in healthcare and education. "Our mission is to make technology more human, and emotional intelligence is key to achieving that goal." (Mark Sagar, CEO of Soul Machines, 2020).

The "Metaverse" virtual worlds in which users can communicate and create, represents the next step in the digital revolution. Emotional intelligence is essential for the development of a human-centric metaverse. "The future of the metaverse depends on our ability to create spaces that are not only technically impressive but also emotionally meaningful to users." (Tim Sweeney, Founder of Epic Games, 2021).

Emotional Intelligence and Education

The digital revolution is not something we are anticipating, but rather our reality that we are currently living in, where the development of technology is accelerating exponentially every day. In such an environment, nurturing and strengthening emotional intelligence (EI) must be a priority task, not only in creative processes and industries, but generally, in all areas, at all levels. The integration of EI into AI systems is no longer just a technological challenge, but a priority ethical imperative. For AI to truly serve civilization, it must be designed to take into account human emotional needs. This is especially important in the areas of healthcare and education, where empathy and emotional understanding are key to achieving good results.

Emotional intelligence must play an extremely important role in educational systems, as an essential prerequisite for quality development of all other areas. The acceleration of the digital revolution requires fundamental reforms of all educational systems on a global level. Today, it is not enough to just learn the knowledge and skills needed for the current moment, but it is necessary to master the

competencies that after schooling allow for continued independent learning and skills transformation, which will fluidly follow the new requirements dictated by constant technological development. New programs and curricula should be structured in a way that they can easily be upgraded along the way and keep up with the development and progress of technology. Since educational systems are a complex topic, this abstract could serve as a starting point for the elaboration of a more comprehensive and detailed work on this topic.

Conclusion

In a world of increasing dominance of artificial intelligence (AI), emotional intelligence (EI) becomes key to maintaining authentic meaningful human relationships and necessary for balancing technological progress with human values. The digital revolution and artificial intelligence can significantly improve our efficiency and productivity, but at the same time carry a great risk of dehumanization. Emotional intelligence plays a key role in overcoming this risk, so that our ability to empathize and connect on a human level becomes more important than ever. In a future where we increasingly rely on digital interactions, authenticity and empathy undoubtedly become the most valuable human currencies.

Gary Kasparov, the chess champion through the experience of playing against IBM's computer program Deep Blue, considering the limits of artificial intelligence and the role of human creativity and emotional intelligence in relation to it, said: "Machines have calculations, we have understanding. Machines have instructions, we have purpose. Machines have objectivity, we have passion."

In the context of the accelerated digital revolution, Descartes' maxim "I think, therefore I am" becomes relevant again and opens up a set of old questions, but now from the perspective of a not-so-distant future, in the sense of what exactly will "thinking" mean, what "existing" will mean, and to whom will all of this apply.

Keywords: Emotional intelligence, Digital Revolution, Artificial intelligence, Virtual reality, Metaverse, Creative industries

References

1. Ed Catmull, (2014). Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration.
2. Garry Kasparov, (2017). Deep Thinking: Where Machine Intelligence Ends and Human Creativity Begins.
3. Mark Sagar, (2020). Creating Digital People - A Conversation with Dr. Mark Sagar.
4. Tim Brown, (2019). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation.

An Architectural-cinematic Phenomenon: Interiors by David Lynch

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Abstract:

Originally a cinematographic phenomenon, the concept of creating the "Lynchian" space was translated from the movie screen to real interiors (restaurants, nightclubs, etc.) and presented in the form of spatial installations at one of the most prestigious events in the field of interior design and industrial design – Milan Design Week 2024. Through his work as a film director and artist, David Lynch developed a specific and inextricable connection between the art of building space and, at the same time experiencing it in the film (psychological drama), and guiding through the main narrative of the film and built his authentic attitude towards architecture and authentic sensibility towards design. The experience of architectural spaces and their elements in Lynch's films represents a multisensory experience and a multi-layered reading and interpretation of social relations, which happens affectively and to some extent on an unconscious level (as well as the experience of the action of the film), so criticizing the architectural space and its representation on film is not easy to shape and define. The interpretation of Lynch's spaces is contemplative, intimate, and multi-meaning because "One defining feature of Lynch's work is the feeling that something fundamental to our very being is stored within his small worlds, if only we can discover it" (Martin, 2014, p. 13,14). This paper deals with the analysis of interior and spatial installation as materialized spatial forms/spaces that directly refer to the concept of "Lynchian" interiors: 1) *A Thinking Room*, Salone del Mobile 2024 installation; 2) *Silencio* nightclub in Paris, and 3) *Silencio* nightclub in Manhattan. The main aim of the discussion is to interpret the importance and influence of Lynch's sensibility on architectural design in practice (and in theory) and to translate the concept and authenticity of the experience of "Lynchian" spaces from the film into real, physical space.

Juhani Pallasmaa argues that a filmmaker "often recognises the mental ground of architectural impact more subtly than an architect" (Martin, 2014, p. 12). One of the main determinants of the concept of Lynch's interiors, which complicates their interpretation, is that Lynch, in his spatial constellations, "emphasizes the intertwining of physical and psychological space" (ibid) and encourages provocation in the viewer. The most famous room from Lynch's cinematic oeuvre is *The Red Room* ("the waiting room") from the Twin Peaks TV series. This room has heavy red material curtains instead of walls, a zigzagging pattern floor, a couple of black armchairs, and a pair of floor lamps with ambient lighting. This room does not indicate a spatio-temporal context; it only has its interior, but not exterior. According to some theories, this kind of space has the characteristics of post-humanist architecture (as a new paradigm in architecture). *The Red room* represents a kind of "extended reality" of the architecture of the real world, and as such, it affects events and social relations in it (Garcia, 2024). Lynch's interior is experienced visually, tactilely, sensibly, haptically, multi-sensory and bodily.

During Milan Design Week 2024, Lynch presented his furniture design at tradeshow Salone del Mobile as a pavilion, a spatial installation – *A Thinking Room*. The pavilion's exterior is a wall of dramatic red velvet curtains (a reference to Lynch's 1986 film Blue Velvet), while the interior concept

is a relaxing, contemplative, transcendental and meditative space for visitors (Carlson, 2024). The interior design of *A Thinking Room* consists of tubular walls painted in a dark blue colour, a floor with a pattern of abstract waves and ocen-like textured, and a large wooden chair in the center of the room. Seven metal rods connect the large chair to the ceiling, where they branch out, and the possible interpretation of this detail, as curator Antonio Monda said, is "the connections between something like the soul and the absolute; a flow of energy from your soul" (ibid). In 2011, the *Silencio Club* in Paris was founded, a private members' club with a restaurant/lounge, a stage, and a cinema, and Lynch designed the interior (Gibbons, 2011). This space is inspired by the strange *Club Silencio* in Lynch's thriller/mystery film *Mulholland Drive* (2001). In the club, the dark parts of the room alternate with the golden and shining ones, aiming to create an intimate atmosphere. The second *Silencio club* was opened in 2024 in Manhattan, near the former location of iconic nightclub *Studio 54*. The architects – Crosby Studios, were also inspired by Lynch's interior style, evoking the allure of *Silencio*'s first Paris location, which refers to the atmosphere of the *Club Silencio* from *Mulholland Drive*. The red colour is the central motif of the space – red carpet wall and floor flowers, thin strips of glowing red lighting that outline the spaces; private rooms as small lounge spaces/booths are lined in gold (as a dance floor), and can be concealed by drawing red velvet curtains (Howarth, 2024). Analyzing of the characteristics of the mentioned examples of "Lynchian" interiors is important, and it suggests a current change and trend in the construction of concepts in interior design, where the starting point is multidisciplinarity in approach. The intertwining of cinematography, architecture, and psychology opens up space for further research of interior design and its experience in a broader context. Further research may start with the following questions: What can be learned about Lynch's films by analysing and interpreting their architectural spaces and vice versa? Which values does this "Lynchian" concept of space bring to architectural design?

Keywords: interior design, architecture in cinema, David Lynch, multisensory experience, contemplative experience, pavilion

References

1. Martin, R. (2014). The Architecture of David Lynch. London: Bloomsbury.
2. Garcia, M. (2024). The Posthuman in Architectures and Other Spaces. Archit. Design, 94: 6-13. https://doi.org/10.1002/ad.3008
3. Carlson, C. (2024). David Lynch designs gigantic wooden chair within meditative A Thinking Room. https://www.dezeen.com/2024/04/18/david-lynch-a-thinking-room-gigantic-wooden-chair/, Accessed 5th May 2024.
4. Gibbons, F. (2011). Inside David Lynch's Paris nightclub. https://www.theguardian.com/film/2011/aug/31/david-lynch-disco-paris, Accessed 5th May 2024.
5. Howarth, D. (2024). Crosby Studios looks to the "signature red" of David Lynch for Silencio New York.
https://www.dezeen.com/2024/02/14/crosby-studios-harry-nuriev-silencio-nyc-nightclub/?li_source=LI&li_medium=bottom_block_1, Accessed 5th May 2024.

Leveraging Integrated Marketing Communications and Analytics for Effective Campaigns and Sales Enhancement in Creative Industries

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Abstract:

In the competitive landscape of the creative industries, the success of marketing campaigns and sales strategies increasingly relies on the seamless integration of marketing communications and comprehensive analytics. This paper delves into the synergy between marketing research and analytics, integrated marketing communications, and the nuanced domain of sales management within creative sectors. It presents a strategic framework that employs advanced analytics and cohesive marketing communications to elevate marketing campaigns and sales performance. The research highlights the critical role of data-driven decision-making and cross-channel communication strategies in crafting compelling marketing narratives and optimizing sales outcomes. By combining these elements, the study aims to provide a roadmap for businesses in the creative industries to harness the power of analytics and integrated communications for improved campaign effectiveness and sales growth. The paper argues for a holistic approach to marketing and sales, emphasizing the need for alignment between research, analytics, and practical execution to achieve superior market positioning and financial results.

Creative industries, more than any other industry today, require integrated marketing communication based on solid research, followed by effective marketing management analytics to ensure successful sales management and market success.

Creative industries are defined as a set of economic activities dedicated to generating and exploiting knowledge and information. This sector is also known as the creative economy or cultural industry, and it represents a combination of creativity and business aimed at achieving economic development. As we know, the IT sector and software development, design, the graphic industry, and generally the web are the fastest-growing branches of industry today. Given that all these activities are classified as creative industries, it is clear why this segment of every economy has become so popular [Florida, 2002; Howkins, 2001].

Creative industries are an important sector in the Serbian economy, contributing 5.8% to 6.3% of the GDP. The export of creative industry products increased by 81%, accounting for 2.5% of Serbia's total exports in 2021. At the same time, creative industries in Serbia are generating an increasing number of jobs – 19,000 more employees than in 2019, now including 155,138 jobs, which is 7% of the total number of employees in Serbia. Among these employees, 49% are women, 45% are highly educated, and 60% are young people aged 25 to 45 [Serbian Ministry of Culture and Information, 2022]. Creative industries put Serbia's intellectual capital in the foreground and include publishing, print media, the graphic industry, IT and software development, the music and film industries, design, radio and television, advertising, fashion, and traditional crafts.

Forecasts suggest that creative industries will continue to grow in terms of the number of enterprises, the number of employees, and their share of GDP. Their contribution to innovation and ease of life, as well as aesthetic improvements, is already significant and will certainly continue to grow over time [UNESCO, 2013].

In the competitive environment of creative industries, the success of marketing campaigns and sales strategies increasingly relies on the seamless integration of marketing communications and comprehensive analytics. This paper addresses the synergy between marketing research and analytics, integrated marketing communications, and the nuanced domain of sales management within the creative sector [Fill, 2013].

For any industry today, especially for companies in the creative industry, making good and timely marketing management decisions is of utmost importance. For marketing management decisions to be good and timely, it is essential to have, above all, quality and reliable information. Quality and reliable information are obtained through a well-conducted marketing research process [Malhotra, 2015].

Therefore, it is more than clear that everything that will later lead to good integrated marketing communication, business improvement, and market success of a company operating in the creative industry starts with research. Only through well-conducted research do we obtain the right information needed to formulate integrated marketing communications towards improving sales and achieving higher levels of success within the creative industry [Burns & Bush, 2014].

This paper indicates that for research to be well conducted, it is necessary to have a good understanding of the marketing research process itself, including all its phases. Any good research, including that which is significant for the development of any creative industry, involves primarily defining the problem and the research goal (e.g., market entry, market share improvement, sales enhancement...), then defining the basic set or sample of the research well (who we are researching and for what reason, who is the target group from whom we want to obtain information...), setting clear and precise research hypotheses, choosing research methods (e.g., choosing one: historical method, survey method, experimental method, observation method... or combining several research methods), well-conceptualized research questionnaire design (based on the hypotheses), properly conducting the field research, and then good analytics through the processing and presentation of research results [Churchill & Iacobucci, 2010].

Only if the research is conducted in an adequate and scientifically grounded manner can the right information be obtained, which is necessary for the creative industry sector to first set up and then realize integrated marketing communication [Tuten & Solomon, 2014].

Integrated marketing communications in the creative industry involve a communication strategy where a unique message is conveyed to the target groups of the creative industry through multiple and different communication channels. The essence of integrated marketing communications in the creative industry is that every message delivered to customers at every stage of the purchase decision-making process is relevant [Belch & Belch, 2017].

Integrated communications gain significance with the proliferation of a large number of communication channels and means. This has been particularly contributed to by the development of communication means in the digital sphere. The development of digital channels has significantly increased the number of touchpoints where a brand within the creative industry sector communicates with the customer or product/service user (Brand Touchpoints) [Chaffey & Ellis-Chadwick, 2019]. At

the same time, this paper highlights that due to the existence of a large number of communication channels and a large number of brands using them, it is increasingly difficult to capture the attention of the target group. When consumer attention is divided in many directions, it becomes a greater challenge to capture a moment of focused attention where influence can be exerted. In this context, through intensive work with the client, we create precisely the communication strategy and develop creative solutions for all means of communication (content), which will achieve maximum results through an optimized budget [Ryan, 2016].

The paper indicates the necessity of a strategic framework that uses advanced analytics and cohesive marketing communication to enhance marketing campaigns and sales performance. The research emphasizes the critical role of data-driven decision-making and cross-channel communication strategies in creating compelling marketing narratives and optimizing sales outcomes [Rogers, 2016]. By combining these elements, the study aims to provide guidelines for businesses in the creative industries to harness the power of analytics and integrated communications for improved campaign effectiveness and sales growth. The paper highlights a holistic approach to marketing and sales, emphasizing the need for alignment between research, analytics, and practical execution to achieve superior market positioning and financial results [Porter, 1998].

Keywords: Creative Industries, Integrated Marketing Communications, Marketing Research, Data-Driven Decision Making, Creative Economy

References

1. Belch, G. E., & Belch, M. A. (2017). Advertising and Promotion: An Integrated Marketing Communications Perspective. McGraw-Hill Education.
2. Burns, A. C., & Bush, R. F. (2014). Marketing Research. Pearson.
3. Chaffey, D., & Ellis-Chadwick, F. (2019). Digital Marketing: Strategy, Implementation and Practice. Pearson.
4. Churchill, G. A., & Iacobucci, D. (2010). Marketing Research: Methodological Foundations. Cengage Learning.
5. Fill, C. (2013). Marketing Communications: Brands, Experiences and Participation. Pearson.
6. Florida, R. (2002). The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life. Basic Books.
7. Howkins, J. (2001). The Creative Economy: How People Make Money from Ideas. Penguin.
8. Malhotra, N. K. (2015). Marketing Research: An Applied Orientation. Pearson.
9. Porter, M. E. (1998). Competitive Strategy: Techniques for Analyzing Industries and Competitors. Free Press.
10. Rogers, D. L. (2016). The Digital Transformation Playbook: Rethink Your Business for the Digital Age. Columbia Business School Publishing.
11. Ryan, D. (2016). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation. Kogan Page.
12. Serbian Ministry of Culture and Information. (2022). Annual Economic Report.
13. Tuten, T. L., & Solomon, M. R. (2014). Social Media Marketing. Pearson.
14. UNESCO. (2013). Creative Economy Report 2013 Special Edition: Widening Local Development Pathways. United Nations.

Integrating marketing research and sales management: A Pathway to Value Creation and Enhanced Campaign Strategies in the Creative Industries

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Abstract:

The creative industries represent a dynamic and rapidly evolving sector that significantly contributes to economic development. Effective marketing strategies within this domain require a robust integration of marketing research and sales management. This paper explores the synergy between these elements, emphasizing the importance of data-driven decision-making and integrated marketing communications. Through a comprehensive review of current practices and theoretical frameworks, this study provides a strategic roadmap for enhancing campaign effectiveness and achieving superior market positioning. The findings underscore the critical role of quality research and advanced analytics in driving growth and innovation in the creative industries.

Introduction

The creative industries, encompassing sectors such as IT, design, media, and entertainment, are pivotal to contemporary economic landscapes. This sector, often referred to as the creative economy, integrates creativity and business to foster economic development [Howkins, 2001]. The rapid growth of this sector necessitates sophisticated marketing strategies that leverage comprehensive research and analytics to drive sales and market success [Florida, 2002]. This paper aims to elucidate the importance of integrating marketing research with sales management to enhance value creation and optimize marketing campaigns in the creative industries.

Methods

This study employs an integrative literature review methodology, synthesizing findings from seminal works and recent studies on marketing research, sales management, and the creative industries. Key sources include academic journals, industry reports, and authoritative texts. The research focuses on identifying best practices, theoretical frameworks, and practical applications of integrated marketing communications and data-driven decision-making.

Results

Marketing Research in the Creative Industries

Effective marketing in the creative industries begins with robust research. This involves defining research problems and objectives, selecting appropriate methodologies, and conducting thorough data analysis. Quality marketing research provides critical insights into consumer behavior, market trends, and competitive dynamics [Malhotra, 2015]. It sets the foundation for formulating integrated marketing strategies that resonate with target audiences.

Sales Management Integration

Integrating marketing research with sales management enhances strategic planning and execution. Sales management benefits from research insights by aligning sales strategies with market needs and preferences. This integration facilitates better resource allocation, personalized marketing efforts, and improved customer relationship management [Churchill & Iacobucci, 2010].

Data-Driven Decision Making

The proliferation of digital technologies has amplified the role of data in marketing. Data-driven decision-making involves leveraging analytics to inform strategy development, monitor campaign performance, and optimize outcomes. Advanced analytics tools enable marketers to track customer interactions across multiple touchpoints, providing a holistic view of the customer journey [Chaffey & Ellis-Chadwick, 2019]. This approach ensures that marketing communications are timely, relevant, and impactful.

Discussion

The integration of marketing research and sales management is essential for the creative industries to thrive in a competitive environment. This synergy allows for the development of cohesive marketing narratives that enhance brand positioning and drive sales growth. Data-driven strategies enable businesses to respond swiftly to market changes and consumer demands, fostering innovation and sustainable growth [Belch & Belch, 2017].

The study highlights the need for a holistic approach to marketing and sales, where research, analytics, and execution are seamlessly aligned. By adopting this integrated framework, businesses in the creative industries can achieve superior market positioning and financial results.

Conclusion

Integrating marketing research with sales management is a critical pathway to value creation and enhanced campaign strategies in the creative industries. This integration not only improves the effectiveness of marketing efforts but also drives innovation and growth. Future research should focus on developing advanced analytical models and exploring new avenues for integrating digital technologies into marketing strategies.

Keywords: Creative Industries, Integrated Marketing Communications, Marketing Research, Data-Driven Decision Making, Sales Management

References

1. Belch, G. E., & Belch, M. A. (2017). Advertising and Promotion: An Integrated Marketing Communications Perspective. McGraw-Hill Education.
2. Burns, A. C., & Bush, R. F. (2014). Marketing Research. Pearson.
3. Chaffey, D., & Ellis-Chadwick, F. (2019). Digital Marketing: Strategy, Implementation and Practice. Pearson.
4. Churchill, G. A., & Iacobucci, D. (2010). Marketing Research: Methodological Foundations. Cengage Learning.
5. Florida, R. (2002). The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life. Basic Books.
6. Howkins, J. (2001). The Creative Economy: How People Make Money from Ideas. Penguin.
7. Malhotra, N. K. (2015). Marketing Research: An Applied Orientation. Pearson.
8. Rogers, D. L. (2016). The Digital Transformation Playbook: Rethink Your Business for the Digital Age. Columbia Business School Publishing.

Educational Technology and E-learning: Integrating Smart Technology and Digital Tools to Enhance Learning Experiences and Foster Innovation

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Abstract:
This paper investigates the integration of smart technology and digital tools in educational settings to enhance learning experiences and promote innovation and entrepreneurship. By exploring various educational technologies and their applications, the study highlights the benefits and challenges associated with implementing these tools in teaching materials and curricula. The findings underscore the potential of educational technology to transform traditional learning environments, making them more interactive, engaging, and effective. The paper concludes with recommendations for educators and policymakers on how to best leverage these technologies to foster a culture of innovation and entrepreneurship among students.

Keywords: Educational Technology, E-learning, Smart Technology, Digital Tools, Innovation, Entrepreneurship

Introduction

The rapid advancement of technology has significantly impacted various sectors, including education. Educational technology, or EdTech, encompasses a wide range of digital tools and smart technologies designed to enhance learning experiences and outcomes. This paper explores how integrating these technologies into teaching materials and curricula can foster innovation and entrepreneurship, ultimately transforming traditional educational practices (Johnson et al., 2016).

Methods

This study employs a mixed-methods approach, combining a comprehensive literature review with case studies of educational institutions that have successfully integrated smart technologies and digital tools. The literature review focuses on current trends, benefits, and challenges of EdTech, while the case studies provide practical insights into the implementation processes and outcomes.

Results

Literature Review

The literature reveals several key trends in educational technology, including the use of interactive whiteboards, learning management systems (LMS), virtual and augmented reality (VR/AR), and mobile learning applications. These technologies have been shown to increase student engagement, facilitate personalized learning, and improve overall educational outcomes (Picciano, 2017).

Case Studies

- Interactive Whiteboards: Schools implementing interactive whiteboards have reported increased student participation and improved comprehension of complex concepts. These tools allow for dynamic presentations and interactive lessons, making learning more engaging (Smith et al., 2005).
- Learning Management Systems: LMS platforms like Moodle and Canvas provide centralized access to course materials, assessments, and communication tools, fostering a more organized and efficient learning environment. They also support blended learning models, combining online and face-to-face instruction (Watson & Watson, 2007).
- Virtual and Augmented Reality: VR and AR technologies offer immersive learning experiences that can simulate real-world scenarios, enhancing students' understanding and retention of information. For example, medical students can practice surgical procedures in a virtual environment before performing them on actual patients (Merchant et al., 2014).
- Mobile Learning Applications: Mobile apps facilitate anytime, anywhere learning, providing students with access to educational content and resources on their smartphones and tablets. This flexibility supports continuous learning and accommodates diverse learning styles (Crompton, 2013).

Discussion

The integration of smart technology and digital tools in education presents numerous opportunities for fostering innovation and entrepreneurship. By making learning more interactive and personalized, these technologies encourage students to think creatively and develop problem-solving skills essential for entrepreneurial success. However, challenges such as the digital divide, teacher training, and resistance to change must be addressed to fully realize the potential of EdTech (Selwyn, 2016).

Educators and policymakers play a crucial role in facilitating the adoption of educational technologies. Professional development programs should be established to equip teachers with the necessary skills and knowledge to effectively integrate these tools into their teaching practices. Additionally, investment in infrastructure and support systems is essential to ensure equitable access to digital resources for all students (Ertmer & Ottenbreit-Leftwich, 2010).

Conclusion

Educational technology holds great promise for enhancing learning experiences and fostering innovation and entrepreneurship. By integrating smart technologies and digital tools into teaching materials and curricula, educators can create more engaging, interactive, and effective learning environments. Future research should focus on developing strategies to overcome the challenges associated with EdTech implementation and exploring new technologies that can further transform education.

References

1. Crompton, H. (2013). A historical overview of mobile learning: Toward learner-centered education. In Z. L. Berge & L. Y. Muilenburg (Eds.), Handbook of mobile learning (pp. 3-14). Routledge.
2. Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. Journal of Research on Technology in Education, 42(3), 255-284.
3. Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2016). NMC Horizon Report: 2016 Higher Education Edition. The New Media Consortium.
4. Merchant, Z., Goetz, E. T., Cifuentes, L., Keeney-Kennicutt, W., & Davis, T. J. (2014). Effectiveness of virtual reality-based instruction on students' learning outcomes in K-12 and higher education: A meta-analysis. Computers & Education, 70, 29-40.
5. Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. Online Learning, 21(3), 166-190.
6. Selwyn, N. (2016). Education and Technology: Key Issues and Debates. Bloomsbury Publishing.
7. Smith, B., Hardman, F., & Higgins, S. (2005). The impact of interactive whiteboards on teacher-pupil interaction in the National Literacy and Numeracy Strategies. British Educational Research Journal, 31(3), 443-457.
8. Watson, S. L., & Watson, W. R. (2007). An argument for clarity: What are learning management systems, what are they not, and what should they become? TechTrends, 51(2), 28-34.

Photoluminescent properties of ZrO2:Er3+ and ZrO2:Er3+/Yb3+ films obtained by plasma electrolytic oxidation – research overview

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Abstract

The modern era is unimaginable without devices based on luminescence. Televisions, monitors, fluorescent lamps, medical X-ray devices, and lasers all contain luminescent materials. The first luminescent materials were made by alchemists, quite by accident while trying to make gold. Alchemist Casciarolo did not succeed in synthesising gold but discovered that the stone he created began to glow in the dark after being exposed to sunlight during the day. Similar findings subsequently appeared throughout Europe, and the stones with the property of emitting light were named phosphors [1].

ZrO2 is a technologically important material and has become the subject of intense research due to its properties, such as low electrical and thermal conductivity, high melting point, and high dielectric constant. These characteristics make ZrO2 valuable in numerous applications, including fuel cells, gas sensors, construction materials, protective layers for optical mirrors, etc. Additionally, this oxide is widely used as an efficient matrix for embedding trivalent rare earth ions to create photoluminescent materials due to its low phonon frequency (470 cm^{-1}) and excellent chemical, photochemical, and photothermal stability, high refractive index, and high transparency in the visible and near-infrared spectrum [2,3].

Trivalent rare earth ions are characterised by a partially filled 4f orbital shielded by the $5s^2$ and $5p^6$ orbitals, with f-f transitions characterised by sharp spectral lines [1]. Among the trivalent rare earth ions, Er^{3+} and Yb^{3+} with electronic configurations $4f^{11}$ and $4f^{13}$, respectively, dopants are interesting due to their unique transitions in the visible and near-infrared spectra.

Plasma electrolytic oxidation (PEO) enables the formation of oxide layers in suitable electrolytes on light metals and their alloys. By selecting the appropriate chemical composition of the electrolyte, its concentration, the substrate, and the applied electrical parameters, it is possible to obtain oxide layers with specific characteristics through the PEO process, which can be used for various industrial applications. The formed oxide layers adhere well to the substrate, have high hardness, and exhibit good corrosion, electrical, and thermal properties [4].

The aim of this research is to synthesise ZrO2:Er3+ and ZrO2:Er3+/Yb3+ films on zirconium through the PEO process in an alkaline electrolyte containing Er2O3 and Yb2O3 particles and to investigate their photoluminescent properties and energy transfer mechanisms.

In the working electrolyte, Er2O3 and Yb2O3 particles are negatively charged because their isoelectric point is around 9, while the pH value of the electrolyte is about 12, allowing them to move towards the zirconium anode under the influence of a strong electric field. The melting points of Er2O3 and

Yb2O3 are 2344 °C and 2355 °C, respectively. It is assumed that the locally high temperatures induced by micro-discharges (5000 °C) during the PEO process will melt the Er2O3 and Yb2O3 particles, allowing them to react with ZrO2 and form ZrO2:Er3+ and ZrO2:Er3+/Yb3+ films [2].

Keywords: Luminescent materials, ZrO2, Photoluminescence, Trivalent rare earth ions, Plasma electrolytic oxidation (PEO), Erbium (Er^{3+}).

Conclusion

This study examined the photoluminescent characteristics and energy transfer mechanisms in ZrO2:Er3+ and ZrO2:Er3+/Yb3+ films formed through the PEO process on zirconium in an alkaline electrolyte (aqueous solution of 8 g/L Na3PO4·12H2O) containing Er2O3 and Yb2O3 particles at a constant current density of 150 mA/cm^2.

The morphology of the formed films is determined by the duration of the PEO process. SEM images of oxide layers obtained at various stages of the PEO process on zirconium in an aqueous solution of 8 g/L Na3PO4·12H2O + 2 g/L Er2O3, as well as SEM images of oxide layers obtained in an aqueous solution of 8 g/L Na3PO4·12H2O + 2 g/L Er2O3 + 2 g/L Yb2O3, show that the oxide layer surfaces contain numerous microchannels and regions formed by the cooling of melted material in contact with the electrolyte. Prolonging the PEO process time reduces the homogeneity of channel distribution on the oxide layer surfaces while increasing their diameter. Cross-sectional analysis shows that the thickness of the layers increases with the PEO process duration. EDS mapping indicates that the distribution of elements present in the layer is approximately uniform across its surface and depth.

XRF method data show that the content of Er and Yb increases with the PEO process duration due to the increased thickness of the oxide layers and that Yb is incorporated more than Er, although the Yb/Er ratio remains constant across different PEO process phases.

No diffraction maxima from Er2O3 and Yb2O3 were detected in the diffractograms due to their low concentration in the formed films. The photoluminescent properties of ZrO2 oxide layers doped with rare earth ions are attributed to the ZrO2 matrix and the rare earth ions.

Down-conversion analysis showed that with the increase in PEO process duration, the shape of emission and excitation spectra does not change, but the FL intensity increases due to the increased oxygen vacancies and Er^{3+} ions in the formed films. The incorporation of Yb^{3+} ions into the formed films does not change the FL intensity and shape of the FL spectra. Up-conversion analysis shows that the photoluminescent emission spectra of ZrO2:Er3+ films excited at 980 nm consist of typical f-f transitions of Er^{3+} ions, and the FL intensity increases with the PEO process duration and the increase in Er^{3+} ion concentration in the formed films. Since Yb^{3+} ions are efficient sensitizers for Er^{3+} ions, adding Yb^{3+} to ZrO2:Er^{3+} increases the FL by an order of magnitude through up-conversion compared to ZrO2 doped with Er^{3+}.

References:

[1] Đačanin, Lj. (2014). *Luminescentna svojstva litijum-indijum oksida dopiranog jonima retkih zemalja* (Doctoral dissertation, University of Novi Sad, Faculty of Science, Department of Physics).
[2] Stojadinović, S., Tadić, N., & Vasilić, R. (2018). Down-conversion photoluminescence of ZrO2:Er3+ coatings formed by plasma electrolytic oxidation. *Materials Letters, 219*, 251–255.
[3] Stojadinović, S., & Vasilić, R. (2016). Formation and photoluminescence of Eu^{3+} doped zirconia coatings formed by plasma electrolytic oxidation. *Journal of Luminescence, 176*, 25–31.
[4] Stojadinović, S., Radić, N., Grbić, B., Maletić, S., Stefanov, P., Pačevski, A., & Vasilić, R. (2016). Structural, photoluminescent and photocatalytic properties of TiO2:Eu3+ coatings formed by plasma electrolytic oxidation. *Applied Surface Science, 370*, 218–228.

Enhancing decision-making quality in risk situations through business intelligence: a comprehensive research abstract

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Abstract:
In today's dynamic business landscape, organizations face an ever-growing array of risks ranging from market volatility and regulatory changes to cybersecurity threats and natural disasters. Effective risk management necessitates informed decision-making grounded in robust data analysis and strategic foresight. Business intelligence (BI) emerges as a critical enabler in this regard, offering a multifaceted approach to enhancing decision-making quality in risk situations. This research abstract presents a comprehensive overview of the role of BI in augmenting decision-making quality amidst risk, drawing upon an extensive body of literature and empirical evidence.
The abstract begins by delineating the conceptual framework of BI and its relevance to risk management. It elucidates the fundamental principles of BI, including data integration, analytics capabilities, and decision support functionalities, highlighting their applicability in mitigating risks and seizing opportunities. Subsequently, the abstract delves into the various dimensions of BI's impact on decision-making quality in risk situations, encompassing:

1. **Data-driven Risk Assessment**: BI facilitates the aggregation and analysis of diverse data sources, enabling organizations to conduct comprehensive risk assessments. Through predictive analytics and anomaly detection techniques, BI empowers decision-makers to identify potential risks and their underlying drivers, fostering a proactive risk management approach.
2. **Real-time Monitoring and Alerting**: BI platforms offer real-time monitoring capabilities, enabling organizations to track key risk indicators and trigger alerts in response to deviations. By providing timely insights into emerging risks, BI enables decision-makers to take swift and targeted actions, thereby mitigating potential threats.
3. **Scenario Analysis and Sensitivity Testing**: BI enables organizations to conduct scenario analysis and sensitivity testing, evaluating the potential impact of various risk scenarios on business outcomes. Through scenario modeling and Monte Carlo simulations, decision-makers gain valuable insights into the likelihood and severity of different risk events, facilitating informed decision-making.
4. **Decision Support and Strategic Alignment**: BI equips decision-makers with intuitive dashboards, reports, and visualization tools, facilitating data-driven decision-making in risk situations. By aligning risk management efforts with strategic objectives and stakeholder expectations, BI ensures that risk mitigation strategies are congruent with organizational goals.
5. **Continuous Improvement and Adaptive Resilience**: BI fosters a culture of continuous improvement and adaptive resilience by facilitating post-mortem analysis of risk events and responses. Through iterative learning and feedback loops, organizations refine their risk

management processes, enhancing their ability to anticipate, mitigate, and adapt to evolving risk landscapes.

The abstract concludes by underscoring the transformative potential of BI in enhancing decision-making quality in risk situations. It emphasizes the need for organizations to embrace BI as a strategic imperative in their risk management endeavors, leveraging its capabilities to navigate uncertainty, drive innovation, and sustain long-term competitiveness.

Overall, this research abstract provides a comprehensive synthesis of the extant literature on BI and its impact on decision-making quality in risk situations. It serves as a foundational framework for further empirical research and practical applications in the domain of risk management and business intelligence.

Keywords*: Business Intelligence (BI), Decision-making Quality, Risk Situations, Data-driven Risk Assessment, Real-time Monitoring, Scenario Analysis, Sensitivity Testing, Decision Support*

References:

1. Watson, H. J., Wixom, B. H., & Hoffer, J. A. (2014). The BI Primer: Business Intelligence – Concepts, Methodologies, Tools, and Applications. Newnes.
2. Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. MIS Quarterly, 36(4), 1165-1188.
3. Hillson, D., & Murray-Webster, R. (2017). Understanding and managing risk attitude. Gower Publishing Ltd.
4. Lam, J. (2003). Enterprise risk management: from incentives to controls. John Wiley & Sons.
5. Florizoone, B., Meeus, M. T. H., & Knockaert, M. (2018). How entrepreneurial decision-making influences the growth of academic spin-offs: a literature review. International Entrepreneurship and Management Journal, 14(2), 309-338.
6. LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. MIT Sloan Management Review, 52(2), 21-32.
7. Lechtenbörger, J., Ritter, N., & Guinard, D. (2013). A semantic business intelligence framework for small and medium-sized enterprises. Information Systems and e-Business Management, 11(4), 491-526.

About the Conference

The Faculty of Contemporary Arts, Information Technology School and the Institute of Contemporary Education are pleased to invite you to participate in the second LINK IT & EdTech International Conference – LINK IT & EdTech24, which will be held in a hybrid format from 24 to 25 May 2024 – in Belgrade Palace (5 Masarikova Street) as well as via live stream. The goal of the conference is to explore the application of information technologies in education, with the exchange of knowledge and ideas among experts in the field of education and information and communication technologies. Also, as the conference, in addition to the part related to educational technologies, considers the application of information technologies in other economic and social spheres, the goal of this conference is the exchange of knowledge, opinions and experiences of various scientific, academic and professional persons (dissemination of acquired knowledge). The conference is accredited by the Institute for the Improvement of Education, and every participant with a submitted extended abstract of a full paper who attends the conference will receive a certificate from the Institute and points for professional development (the form of professional development: conference). Conference topics include, but are not limited to, the following:

- Examples of the use of IT in different industries;
- Application of robots in education;
- Tips and recommendations for using IT in everyday business;
- Advantages and disadvantages of different operating systems;
- Cloud computing and the use of cloud services;
- Security in IT: how to protect data and networks;
- Application development and programming;
- Construction and management of databases;
- Machine Learning and Artificial Intelligence;
- Internet of Things (IoT) and the use of smart devices;
- Virtual and augmented reality;
- Blockchain and cryptocurrencies;
- IT career and competence development;
- The use of information technologies in education and teaching;
- IT innovations and their impact on society, economy, and education;
- Entrepreneurship in the field of information technologies;
- Digital multimedia;
- Big data;
- Software engineering;
- Digital marketing and media;
- Legal aspects and data privacy;
- Application of artificial intelligence for process automation in educational institutions;
- Pedagogical aspects of the application of robotics in education;
- Application of EdTech tools in the teaching of humanities and art subjects
- Art and application of information technology;
- Other areas of interest for the application of IT in education, economy and society.

Also, we have a Smart4Future Special Session: Triangle of Knowledge dedicated to the Smart4Future project.
Photos and videos from the two days of the Conference (Keynote session, Work sessions and Student Symposium) can be found at the following link: https://edtech.link-conference.org (the website of the Conference).

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