World Academy of
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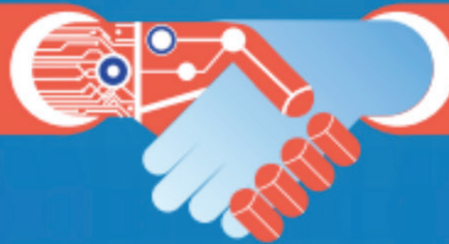
World
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СРПСКА
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РИМСКИ КЛУБ

FUTURE
EDUCATION
BELGRADE 2019

REPORT

BELGRADE

NOVEMBER
11-13, 2019

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Charting out Fundamental Principles for a New Paradigm in Education

From left to right: Vladimir Kostić, Dragan Đuričin, Nebojša Nešković, Heitor Gurgulino de Souza & Aleksandar Vlahović

The speed, magnitude, and complexity of the challenges confronting global society today pose serious challenges and demand major transformational changes in the way we prepare future generations for life in an increasingly unified, rapidly evolving global society.

Existing educational institutions struggle to keep up with these challenges and seek answers to the following critical issues:

- The growing global skills gap
- The challenges of the 4th Industrial Revolution
- The disciplinary barriers to integrated contextual approaches to the real world
- The shift from deeply entrenched institutional structures to rapid transformation of educational pedagogy and content
- The shift from subject-centered to person-centered education
- The need for fresh thinking rather than repetition of old knowledge
- The place of values and character development in human accomplishment
- The demand for life-long learning

The Fourth International Conference on Future Education in Belgrade was an endeavor to develop conceptual and practical solutions to these challenging issues. There are no simplistic solutions to address any of these challenges. The Belgrade Conference was an important step towards formulating a new paradigm of education that is transdisciplinary, person-centred, contextual, collaborative and value-based.

Education for Individuality

The Serbian Premier **Ana Brnabić** said in her inaugural speech that only a society based on innovation, creativity and free thinking individuals can be a driving force of development. Our education must lay the foundation for such individuality in all. In our formal and informal learning spaces, we need to teach our youth to be courageous, to challenge, question, think critically, and dare to make mistakes.

Organizers, Co-Chairs and Themes of the Conference

On November 11-13, 2019, the Fourth International Conference on Future Education took place in Belgrade, Serbia. Its organizers were:

- The World Academy of Art and Science (WAAS),
- The World University Consortium (WUC),
- The Serbian Academy of Sciences and Arts (SASA),
- The University of Belgrade,
- The Serbian Association of Economists (SAE), and
- The Serbian Chapter of the Club of Rome

The Co-Chairs of the Program Committee of the event were **Garry Jacobs**, President & CEO, WAAS and Chairman of the Board & CEO, WUC; **Vladimir Kostić**, President, SASA and **Dragan Đuričin**, Professor, University of Belgrade, while the Chair of the Organizing Committee was **Aleksandar Vlahović**, President, SAE.

The Welcome Chat was held in the Ethnographic Museum in Belgrade, which was preceded by a tour of the Permanent Exhibition of the Museum. The theme of the Chat was Platform for New Education in the Era of Digital Transformation. The Conference was inaugurated by **Ana Brnabić**, Premier of Serbia, and the inaugural speeches were delivered by Vladimir Kostić and Garry Jacobs. In total, there were 93 speakers from 28 countries worldwide.

The themes of the first five Plenary Sessions were:

- Strategic Audit of New Education Challenges and Opportunities
- Digital Opportunities for All Educational Levels
- New Education: From Leadership in Thought to Effective Action
- Education for Full Employment
- Person-Centered Education

The topics of the Panel Discussions were:

- impacts of science, technology and politics on education;
- education of culturally different, environmentally responsible and globally aware citizens;
- fostering creative thinking and innovation in education;
- roles of academic mobility and digital tools in research and education;
- hybrid and flipped educational models;
- social and humanistic sciences in the era of the Fourth Industrial Revolution;
- impacts of research and innovation on education;
- building bridges between disciplines for relevant and effective education;
- dual education;
- interdisciplinarity in digital scholarship;
- closing the skills gap through education;
- education for sustainability and inclusiveness for people and nature;
- shift from subject-centered to student-centered education;
- learning by collaboration; and
- value-based education.

The sixth Plenary Session was devoted to the chosen themes of interest for future education: rainbows as complex phenomena; the island of stability in the periodic table of chemical elements; multiculturalism and interculturalism; and the Confucian philosophy and civic education. The Conference included a concert at the National Museum in Belgrade.

– Nebojša Nešković
Secretary General, WAAS;
President, The Serbian Chapter of the Club of Rome

University and Globalization

Globalization may prove to be one of the most fundamental challenges faced by the university in all its history. The new concept of the knowledge economy highlights the need to direct education of students to the development of skills and competencies for a global workplace. Education has to enable individuals to improvise, use information independently, become better team players, handle complexity, prepare them for a non-linear career course and perform tasks that they have not been originally trained for.

The university is the key place for synthesis of educational and research activities.

The very idea of science may have to be deconstructed.

New paradigms of knowledge production are primarily characterized by the importance of context, not only in terms of the final application of science, defining scientific problems, and selecting pertinent methodology, but by redefining the relevant, usable knowledge that is "socially robust".

– Vladimir Kostić
President, The Serbian Academy of Sciences and Arts

Transformation in Education for Global Leadership

The unifying theme of this conference connecting all aspects of educational pedagogy and content is the human being—student-centered, person-centered, human-centered education. This self-evident fact is so often overlooked in the emphasis on standardized assessment systems, competitive university rankings, campus recruitment, technological tools, public financing, and other issues that an insistent focus on the role and impact of education on individuals and society is of immense importance.

The context for this conference is the challenges and opportunities confronting global society today—the threats, anxiety, uncertainty, as well as the unprecedented potential to accelerate human progress.

Prominent themes included the challenge of emerging technology, the coming of the Fourth Industrial Revolution, the future of employment, the disillusionment of youth, the retreat from democracy, rising inequality, and existential environmental threats. It is clear that these challenges cannot be addressed by the present educational system in any country.

The conference examined the inextricable linkages and interdependencies between education, society, economy, peace, culture, welfare and wellbeing. The need for more, better and different forms of education lies at the heart of all the major challenges confronting humanity today—political, economic, social, psychological and environmental. The conference demonstrated that they also lie at the heart of the solution of all these challenges and to the future of humanity as a whole. They are all aspects and dimensions of a unified, integrated whole we term society.

Education is one of the central pillars of modern society. Change in education is one of the fundamental priorities for what we need to do to face the future and convert these challenges into the unprecedented opportunities which they represent. The change required is not incremental. It is transformational.

The conference wove back and forth between different facets of the problem, between the social macrocosm and the individual microcosm, to chart out fundamental principles of the new paradigm in education that is so urgently required.

Education is the most enlightened institution humanity has created, not the institutions of government. This is the place which has to show humanity the path to a better future. This is where leadership really begins.

It is also clear that changes in education constitute only one key component of a comprehensive strategy. Many speakers have discussed the ecological, economic and social and cultural dimensions of the issue.

The World Academy of Art and Science and World University Consortium are striving to weave all the pieces together through a new project on Global Leadership in the 21st century in collaboration with the United Nations in Geneva.

The project focuses on strategies to affect rapid, radical social transformation, not just in education, but in our economic system, in our financial system, in our political system, in our social systems. All of them have to change. Our global system, international and national institutions have to change.

– Garry Jacobs
President & CEO, WAAS;
Chairman of the Board & CEO, WUC

Person-Centered Approach

A New Paradigm of People-centered Sustainable Education

Education is one of the main narratives to prepare new generations to be an active and constructive part of society, and one of the main carriers of values.

As the principal social organization for the development of human capabilities, education must necessarily play a central role in enabling us to meet the needs of all human beings and protect and promote human and natural capital.

We need to create a new paradigm of people-centered sustainable education at every level of formal and informal education.

To learn how to listen, how to understand empathetically, how to respect the different needs of ourselves and others is education that protects and promotes individual and social health of all life forms.

– Alberto Zucconi
Chairman of the Board, WAAS;
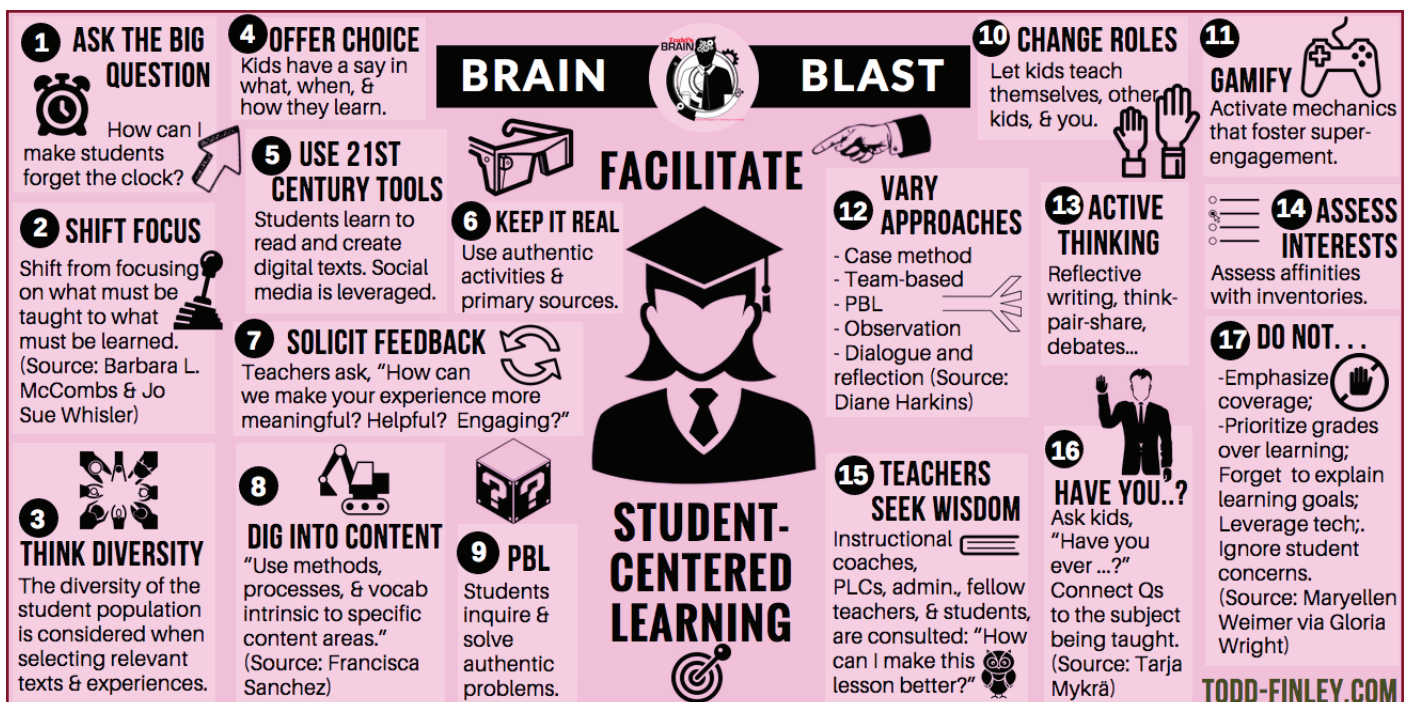**Secretary General, WUC**

Developing the Whole Individual

Education must develop the whole person—his capacities, character and personality, so that he is equipped with life skills to realize his full potential. The primary driver of education is the interest of the student. Schools have to provide an environment that inspires the student to explore their personal aspirations and cultural experiences. Personal relevance increases the students' motivation to learn, their engagement in what is being taught, and in retention and recall. Presenting the content in pluralistic ways as visual, auditory, hands-on activities is important to engage students with different learning faculties. Students have mastery over their learning when they are given a choice. At the heart of learning must be a process of endless discovery of greater knowledge. Students should be encouraged to question, explore, challenge, debate and rediscover for themselves rather than to memorize, accept, and repeat what they are taught. We need to shift from imparting mere information to nurturing thinking. Knowledge is not an object that can be memorized or ingested. It is a capacity inside a person that has to be developed.

– Vani Senthil, Research Analyst,
The Mother's Service Society, India

BRAIN BLAST — FACILITATE — STUDENT-CENTERED LEARNING

1. **ASK THE BIG QUESTION** — How can I make students forget the clock?

2. **SHIFT FOCUS** — Shift from focusing on what must be taught to what must be learned. (Source: Barbara L. McCombs & Jo Sue Whisler)

3. **THINK DIVERSITY** — The diversity of the student population is considered when selecting relevant texts & experiences.

4. **OFFER CHOICE** — Kids have a say in what, when, & how they learn.

5. **USE 21ST CENTURY TOOLS** — Students learn to read and create digital texts. Social media is leveraged.

6. **KEEP IT REAL** — Use authentic activities & primary sources.

7. **SOLICIT FEEDBACK** — Teachers ask, "How can we make your experience more meaningful? Helpful? Engaging?"

8. **DIG INTO CONTENT** — "Use methods, processes, & vocab intrinsic to specific content areas." (Source: Francisca Sanchez)

9. **PBL** — Students inquire & solve authentic problems.

10. **CHANGE ROLES** — Let kids teach themselves, other kids, & you.

11. **GAMIFY** — Activate mechanics that foster super-engagement.

12. **VARY APPROACHES** — - Case method - Team-based - PBL - Observation - Dialogue and reflection (Source: Diane Harkins)

13. **ACTIVE THINKING** — Reflective writing, think-pair-share, debates...

14. **ASSESS INTERESTS** — Assess affinities with inventories.

15. **TEACHERS SEEK WISDOM** — Instructional coaches, PLCs, admin., fellow teachers, & students, are consulted: "How can I make this lesson better?"

16. **HAVE YOU..?** — Ask kids, "Have you ever ...?" Connect Qs to the subject being taught. (Source: Tarja Mykrä)

17. **DO NOT. . .** — -Emphasize coverage; -Prioritize grades over learning; Forget to explain learning goals; Leverage tech; Ignore student concerns. (Source: Maryellen Weimer via Gloria Wright)

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Keeping Pace with Changing Social Needs

Education and what it means to be a learned citizen is changing as new innovations, AI, changing demographics, and changes to our environment force us to reconsider the tried and true concepts important to an educated person.

Critical thinking, communicating, a sense of the changing world around us, and a capacity to help solve problems using new technologies all impact the goals of educators from pre-school to graduate school. Effectively ensuring that this education remains consistent and nimble is of paramount importance to educators from the early years through collegiate education to graduate education. There must be close collaboration between the various parties so that our learners might yield the best benefit.

– Sue Henderson
President, New Jersey City University, USA

From Subject-centered Learning to Student-centered Learning: A Case Study

How can students be made to look forward to Monday morning rather than Friday evening? The Global Institute of Integral Management Studies (GIIMS) is a post-graduate business institute in Kochi, India which has brought about this and other radical improvements by transforming itself into a person-centred organization where learning is contextual, collaborative, life-based and transdisciplinary, and where teachers facilitate learning instead of delivering lectures.

Until recently this institute faced multiple challenges common to many other schools and colleges around the world, such as student absenteeism, lack of classroom participation, poor learning outcomes, low teacher morale and employers' dissatisfaction with the graduates of the institution whom they hired, even after a year or two of classroom learning. Convinced of the futility of using textbooks that provided abstract, fragmented and outdated information, and classroom lectures that students could not relate to, in summer 2018 GIIMS introduced radical innovations in the pedagogy and content of the programs they offered.

The first step was to remove the widespread misconception that logistics is a specialized field of high technology jargon unconnected with everyday life. GIIMS repositioned logistics as a fundamental component of every facet of society—from moving people and products to transferring money and information, from overnight parcel delivery to celebrating an Indian wedding with 3000 guests, managing 1.5 million visitors to the 2018 FIFA World Cup Football championships in Russia, and handling emergency relief after the record floods that dislocated tens of thousands of Kerala citizens during the school year. When students exhibited interest and actively participated, class attendance soared to 99%, learning and retention rates increased markedly, enrollment kept rising as GIIMS' reputation spread through word of mouth, and employers began to clamour for more GIIMS students to hire in their firms.

In the process, faculty members' interest, enthusiasm and impact have risen markedly. Active, peer-to-peer interactive learning has replaced classroom lectures. Students have started asking a lot of questions. Hollywood and Bollywood movies prove to be an excellent source of real world examples. Students have been studying a variety of real life events like national elections, online shopping, movie-making, space travel, disaster relief, and festivals. Students learn logistics as a practical set of concepts and methods rather than abstract principles from textbooks. Recruiters flock to the institute for hiring its graduates.

Other institutes teaching logistics are now hiring fresh GIIMS graduates as faculty members to teach in their own institutions, and all these changes have made the institute the largest logistical institute in India all because of flipping the paradigm and placing the student rather than the subject at the centre.

– S. S. Sreejith, CEO, Global Institute of Integral Management Studies, India; WAAS Associate Fellow; Member of the Board of Directors, WUC

Experiential Immersive Learning

We must build the 'emotional intelligence' of young learners through experiential and immersive learning methodologies that include Mindfulness, Empathy, Compassion, Critical Inquiry.

– Anantha Duraiappah
Director, UNESCO Mahatma Gandhi Institute of Education for Peace & Sustainable Development, India; WAAS Fellow

Finnish Secrets for Better Education

- Exercise and Cognition
- Mindfulness - IT
- Rest and Sleep - 7/24
- Multi-sensory learning - Digital Learning
- Social Competence - Competitiveness
- Nutrition and Supplements - Neuro-enhancement

Ullica Segerstrale, **WAAS Fellow and Professor, Department of Social Sciences, Illinois Institute of Technology, USA**, stated that the reasons listed by the World Economic Forum for the success of Finland's education system closely reflect the factors identified as vital to education by **Stefan Brunnhuber**, **WAAS Trustee and Medical Director, University of Applied Sciences, Mittweida, Germany**.

The Finnish education system does not cater to standardized tests, it focuses on the student instead. Classes provide opportunities for practical and outdoor study, and emphasize cooperation rather than competition among students. The school schedule ensures sufficient rest and relaxation for teachers and students. Teachers are accorded a high social standing in Finnish society, and the entire country has adopted education as an essential investment in people.
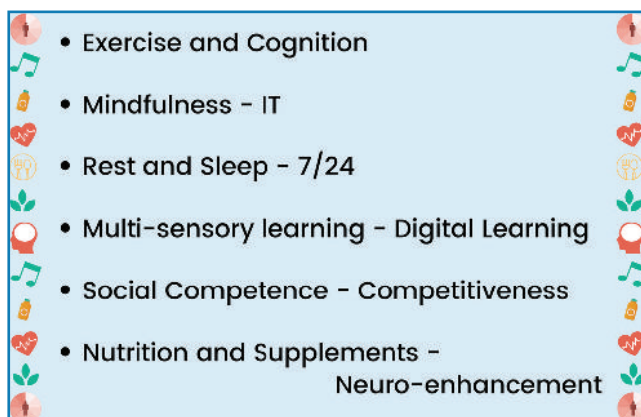
Educators as Pillars of Every Nation

The main pillars of a nation are the educators at the pre-school and elementary school levels. This is where the basic human values are best accepted and the potential for creativity is best nurtured. Educators at these two levels need to be trained in these fields. They also deserve to be much better paid and respected by society.

– Veljko Milutinović
Professor of Computer Science at Indiana University, USA

What Makes Student-centered Learning Successful?

In order for the student-centered approach to be successful, the knowledge transmission paradigm has to be replaced by the competence learning paradigm.

– Davide Scalmani
Former Director, Italian Institute for Culture in Belgrade, Serbia

Transdisciplinary, Life-centered Education

In the process of taking the knowledge learned from experience over millennia and encapsulating it into an educational program that is offered to every student, we have condensed, abstracted and categorized information into small portions. This has led to fragmentation of knowledge, which is reflected in fragmentation in the way we teach, learn, think, understand, build institutions, make policies, work and cope with the world. Our understanding and our lives are becoming increasingly fragmented, compartmentalized and disconnected. Financial systems have become divorced from the real economy they were intended to serve. Technological development is divorced from its impact on employment, human welfare and social stability. Economic theory and policy are arbitrarily separated from the political, legal, technological, social, cultural and psychological dimensions which constitute the foundation and playing field for economic functioning of society.

As we compartmentalize the complex inter-related reality into a thousand disciplines and subdisciplines, each division creates a specialized expertise while obscuring sight of the connectivity between different fields of knowledge. Most of the problems we face at the global level are a result of this attempt to address separate parts of the real world and ignore its interconnected wholeness. Life problems rest in the interstices between disciplinary fields of knowledge, in the no-man's land region where the disciplines

Image credit: Magellan School

remain separate with different perspectives and no one is in charge.

In order to address these challenges, we need a transdisciplinary perspective that bridges the narrow and deeply entrenched boundaries within education. The need for integrated education is already recognized in fields such as Artificial Intelligence where knowledge of psychology, neuroscience, computer science and mathematics is essential. WAAS seeks to foster the development of scientific research and educational systems that transcend narrow disciplinary boundaries to address the complexity of modern life as it really exists and evolve effective integrated solutions.

– Garry Jacobs
President & CEO, WAAS;
Chairman of the Board & CEO, WUC

Future Capital Initiative (FCI)

FCI is another creative effort in transdisciplinarity. The world possesses all the financial resources needed to meet humanity's material needs and foster wellbeing. Money is a networking device and a powerful instrument for promoting sustainable development and wellbeing. But the global monetary and financial system misconstrues its fundamental purpose and role in society and is underperforming and misperforming its intended role. A new financial paradigm is needed based on a fundamental change in consciousness and values.

FCI is a transdisciplinary platform dedicated to developing a conscious global economy. A reductionist world view has resulted in a culture of disparity that characterizes our world today. FCI seeks to address this and restore the right relationship between consciousness and capital.

WAAS has been working with FCI to explore ideas and practical strategies to enhance the effective use of money, financial markets and other forms of capital to address the climate crisis, implement the 17 UN SDGs and achieve other objectives that promote equitable development and wellbeing globally.

– Mila Popovich
Founder, EVOLving Leadership, USA; WAAS Fellow

Shift from Passive to Active, and Competitive to Collaborative Learning

Summary: the 4 Placentas of Future Education
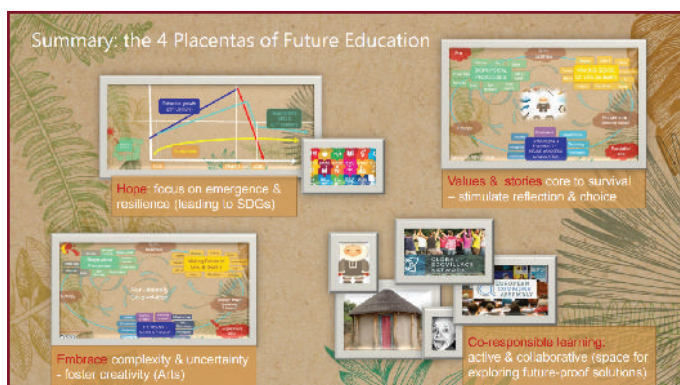
To close the gap between education and current societal problems we cannot use the same kind of thinking that caused those problems. Countries with a high Human Development Index overshoot planetary boundaries, while nations living within those boundaries are deemed 'less developed'.

Future-proof education requires rethinking how we currently define ourselves (as godlike beings above nature), our relationship with life (as a resource for extraction), and our economic-technological means (increasing entropy and depleting life to make money).

Today a new type of civilisation is emerging. Countless initiatives explore open and collaborative ways: biomimicry-based technologies and economic-monetary systems are being designed to restore the wellbeing of communities and ecosystems in accordance with SDGs.

Nourishing future education requires:

1. Giving hope: focusing mainly on the emergent regenerative economics;

2. Values and stories: encouraging self-reflection;

3. Embracing complexity: dynamic systems thinking;

4. Co-responsible learning: active and collaborative exploration of future-proof alternatives, learning from and with indigenous cultures.

– Anne Snick
Independent Researcher, Systems Approach of Public Innovation & Responsible Research, Belgium; Board Member, EU Chapter of the Club of Rome

# Redesigning the University for Transdisciplinarity

Project Stanford 2025 is a step towards transcending disciplinary boundaries. A group of students, faculty members and administrators from Stanford University have come up with a design for the university of the future. Termed Stanford 2025, the project outlines revolutionary shifts in the structure and functioning of the university. A vital aspect is the shift to transdisciplinary learning with a view to preparing students for life and work in the 21st century.

Students will not select majors and focus their studies around subjects and course credits. They will declare life missions instead. For example, students will no longer say 'I am a Biology major or a Computer Scientist'. Instead, they will declare that 'I am learning biology to eliminate world hunger' or 'I am learning Computer Science to build ways for citizens to engage with their governments and thereby promote greater democracy'. Students will then couple their disciplinary pursuit with the purpose that fuels the mission. In order to actualize this vision, Stanford proposes courses of varied lengths and flexible syllabus. Students can set the pace as well as duration of their study. Syllabus will be personalized and adaptive. This will allow time for discussion and reflection in class.

Knowledge within a particular discipline will no longer be the criterion for graduation. The axes will be flipped

Open Loop University | Axis Flip | Paced Education | Purpose Learning | Design A Future
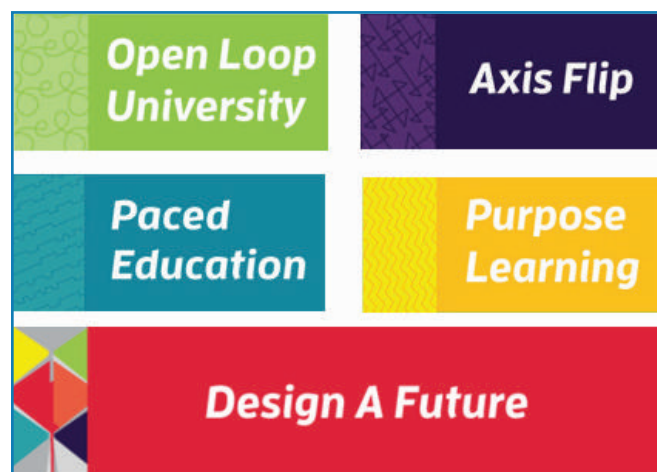
so that skill development becomes the foundation of learning.

Campus departments will become teaching hubs and centres of excellence centred on competences such as Scientific Analysis, Quantitative Reasoning, Social Inquiry and Communication Effectiveness.

The intersections of these competencies will create transdisciplinary learning. This will equip students with the capacity to tackle any type of career and future they find themselves in.

– Janani Ramanathan
Senior Research Analyst, The Mother's Service Society, India; WAAS Fellow

Need for a World University

It is not enough to value the links between experiences, disciplines, creativity and ideas. We have to develop methods, strategies and practices that will transform those links into real connections.

We have to recognize the need for interdependence in order to actualise it, and we have to know how to act once we have developed that recognition.

In ensuring a broad-based education that is globally recognized and allows for global mobility of students, there is a need to develop a World University System that promotes networks of universities with shared qualifications and close research collaborations.

Governments, Ministries of Education, Research and Innovation together with Presidents of universities should take action to reform our university systems and academic structures for the future welfare of the economy and society.

– Marcel Van de Voorde
Professor, University of Technology Delft, Netherlands; Executive Advisor to the Minister of Education and Research, Serbia; WAAS Fellow

Network Knowledge for the 21st Century

Networking can be understood as a matter of trust and confidence. Networks as ways of thinking, communicating, and acting are an important component of education. The more complex our lives are, the more necessity there is to be interlinked.

Modern knowledge largely depends on our ability to create networks, or to join existing networks. The ability to network (where to find knowledge, how to develop networks, how to be linked and with whom) is one of the most important skills for the 21st century. The SDGs are interconnected. Therefore, an understanding of linkages between SDGs and targets is crucial for integrated governance and policy coherence in implementing SD strategies.

Educating students for an interlinked world is the only way to achieve a sustainable future for mankind and Earth.

– Radmilo Pešić, Professor, University of Belgrade, Serbia; Vice-President, Serbian Chapter of the Club of Rome; WAAS Associate Fellow

Learning by Collaborating

Learning to collaborate with others and learning through collaboration with others will be more and more important in future. Without wide and complex collaboration the human race will not be able to cope with rising challenges that it faces. Serbia's 3P Project illustrates the relevance of collaboration. The 3P Project has identified through a collaboration of diverse stakeholders and evidences ten good schools in Serbia and analyzed their practices, history, and future orientations. These schools are different in many respects, but all of them have been characterized by a high quality of collaboration and partnership between students, teachers, parents, and school principals.

Studies of collaboration among children and youth suggest that the main challenges they face when they need to collaborate are: having a mutual understanding of the task and of others; respecting others, their perspective and contribution; coordinating argumentative discussion; and building a joint perspective. These findings indicate what kind of education we need today in order to prepare new generations for the future.

– Aleksandar Baucal
Professor, Faculty of Philosophy, University of Belgrade, Serbia

The Future of Universities

If higher education sector is to be transformative, it needs to transform itself **– Tilbury, 2011**

This statement captures the essence of our exploration of the future of knowledge production and learning in the context of the Anthropocene-Capitalocene, focusing on the idea that thinking, knowledge, beliefs and worldviews—the 'inner worlds'—contribute to powerful, often invisible, drivers underpinning such crises. The EU network 'INTREPID' explores obstacles and enabling conditions for interdisciplinary research in universities, essential to addressing sustainability. INTREPID's Future Initiative studies the role of universities in contributing to transformative change.

Universities can become places of: 1) maximum leverage, 2) questioning and exposing, 3) transformation, 4) engagement, 5) envisioning, and 6) all-system change.

With these six priorities, we propose to undertake a journey 'from problem to solution,' allowing universities to reclaim their role of maximum leverage through the promise of each individual's potential to thrive, electing the wellbeing of all life, the celebration of diversity and connectedness to become the driving forces of learning and knowledge to shape the future.

– Olivia Bina
Principal Researcher, Institute of Social Sciences,
University of Lisbon, Portugal; WAAS Fellow

Zbigniew Bochniarz, Nebojša Savić & Goran Pitić

Branko Urošević, Goran Bašić, Paul Spierings & Dejan Molnar

Ivan Maksimović, Bojan Đokić, Smiljana Antonijević, Milena Stanković & Andreas Riepl

Value-based Education

The Value of Values

Just as physical skills channelize and direct physical energy to produce results, values accomplish the same at the psychological level. If every one of our youth were as dedicated to women's education as Malala Yousufzai or emphatic about protecting the environment as Greta Thunberg, our problems would disappear. An education that nurtures in every individual a strong commitment towards values has already directed the future towards sustainable and inclusive accomplishment for all. Values are the ever receding goals of perfection that raise the quality of a product, service, act, organization, society or an individual. Sustained success in any field, at any level is possible only when positive, progressive values such as integrity, reliability, perfect organization, cleanliness, precision and punctuality are adopted. Among the many ways in which we have fragmented knowledge is the sanitisation of objective facts from subjective human experience. Data obtained from physical experiments and working models, and which can be proven or replicated in the laboratory are considered scientific. All else is generally considered of secondary significance.

One of those fields that have thus been relegated is that of values. But a study of any event in history, a reading of the biography of any inspiring leader, and even a reflection on one's own life experiences can convince one that values play a determinative role in success of any kind. By excluding subjectivity from our education, we diminish the value of the education we give our youth. An education that ignores any perspective fails to take advantage of the wealth of knowledge that is available to us. The wisdom that has been gleamed from millennia of human experience has often been encapsulated in the form of values and passed down traditionally in the home

and through informal education. But since values fall in that area of human experience that cannot be proven in a scientific laboratory setting, our education generally restricts itself to the transfer of the knowledge of objective facts. However, a look at the world around us shows that the challenges we face today are caused in part by a lack of values in our personal, social and political spaces. When the knowledge of values is cleared of anachronisms and superstitions, they can become a valuable source of intuitive knowledge and power with practical value. There has been no case of sustained success in the absence of strong positive values. It is only those that are committed to values who accomplish at a high level. Values differentiate the few on top from the many below.

We need a holistic education that brings back the truths of human subjectivity and the power of positive values into our education.

– Janani Ramanathan, Senior Research Analyst, The Mother's Service Society, India; WAAS Fellow

The Source of Exponential Development

How do we entice and bring forth a sense of higher perspective coupled with deep knowing, with finer sensing for the broadest base impact? What are the laws, the measures, the results that determine the worth, price and meaning of higher accomplishment? There exists a property characterised by paradoxical logic, that multiplies by division. Values such as trust, compassion, beauty, authenticity, self-giving, integrity are those

principles for accomplishment. Skills can be learnt by an individual by themselves to a degree, using a tool that can be amassed in isolation. But values are nurtured only in the relationship between individuals, and set the space for inter-being, co-becoming, in-belonging.

Values are the only source satisfying individual and collective needs to achieve long-term qualitative change for exponential development.

– Mila Popovich
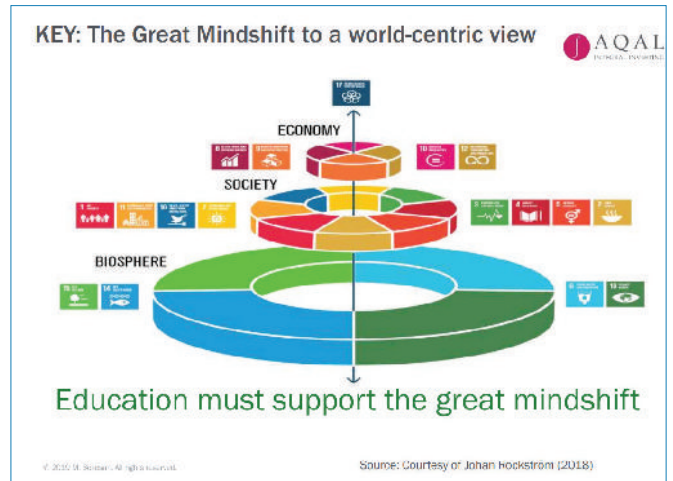**Founder, EVOLving Leadership, USA; WAAS Fellow**

Education for the SDGs

Education that ignites passion and purpose can bring the necessary transformations for achieving the SDGs.

**– Mariana Bozesan,
President, AQAL Foundation,
Germany; WAAS Fellow**

KEY: The Great Mindshift to a world-centric view

ECONOMY

SOCIETY

BIOSPHERE

Education must support the great mindshift

Source: Courtesy of Johan Rockström (2018)

Education and Employment

Developing Human Potential

More and better education is the most powerful and effective means for ensuring continuous, rapid social development and fresher avenues for the creation of greater opportunities for employment. Even better than greater or full employment is self-employment.

The ultimate purpose of education is to develop the full potential of every individual for the fullest development of human civilization.

WAAS has constantly emphasized that leadership in thought precedes leadership in action, and original and creative thought is possible only when individuality is developed in all. That is not possible when we educate students to listen, obey, and conform.

As long as our education focuses on transfer of information in the classroom and evaluates students based on what they can reproduce in the examination, we are encouraging a system that cultivates the capacity for memorization and recall.

We need a shift in the teaching pedagogy to incorporate collaboration, active participation and project-based learning in the classroom, and make evaluation an ongoing process that encourages and reinforces learning. This is being implemented in a few schools, colleges and innovative learning institutions around the world.

One such is Ecole 42, a software programming school in Paris. It is a private, non-profit institution where collaboration rules. There are no professors, classroom lectures, supervision or examinations. Students learn through a peer-to-peer, project-based learning process. Students select a project, do their own research, and get help from each other. The school has no timings and students can complete the course at their own pace. They evaluate each other's work and help each other, thereby learning not just technical skills but the capacities for communication, teamwork, organization, time management, self-discipline, research and creativity.

Entrepreneurship

Business is the economic engine of all modern societies. The need of the hour is entrepreneurship. It is not the mega companies which create new jobs, new products and national wealth. Instead of giving concessions and incentives to large corporations, a nation's focus should be on rapidly developing startups and SMEs. The creation of a startup culture will encourage talented youth and experienced managers to opt for self-employment instead of the security of salaried jobs.

Entrepreneurialism requires not just engineering, accounting or other technical expertise, it requires a set of attitudes and values—to aspire, venture, take risks, accept responsibilities, anticipate, envision and lead. An entrepreneur must have the psychological personality and a well-developed individuality. Entrepreneurial values, attitudes, skills and knowledge can be effectively developed even in schools.

We need an education that can create an entire generation of entrepreneurs. That will be the solution to our problem of unemployment.

– Garry Jacobs
President & CEO, WAAS;
Chairman of the Board & CEO, WUC

Education as an Employment Provider

The future world needs more and better informed, educated and broadminded individuals capable of learning quickly and adapting continuously throughout their lifetimes.

Education provides the essential foundation for life-long learning. Secondary education is not enough. A college education will be as essential in future as primary education became in the 20th century.

One of the most effective strategies for ensuring higher job growth rates is to raise the mandatory minimum and average level of education in every country.

The immediate result of raising the mandatory minimum age will be to generate millions of new jobs for teachers, construction of more schools and production of educational materials.

It will also slow the entry of youth into the labour force.

In the medium term this will raise the qualitative capabilities of the workforce, spawn and attract businesses in search of qualified manpower.

Skills for the Future

The problem of unemployment co-exists with a massive shortage of employable skills. Globally, nearly half the employers cannot find the skills they need, and three quarters believe that skills shortage will be a serious concern in the future. By 2030, skills shortage is expected to reach over 85 million people worldwide and cost companies trillions of dollars in unrealized revenue and lost opportunities. Skill shortage is not confined to the high tech industries, it is also prevalent in basic manufacturing industries. It is seen in developed as well as developing countries. Even countries like India with enormous manpower and training infrastructure suffer from this problem. Large companies with more than 250 employees have twice as much difficulty filling roles as smaller firms. Automation is not taking away jobs as feared, it is redefining them.

All these require that everyone, even those already employed, unlearns and relearns how to work. A study of what skills are in shortage shows the direction that future education needs to take. The top skills that are in demand and in short supply are:

- Creativity
- Communication
- Problem Solving
- Critical Thinking
- Ability to deal with Complexity and Ambiguity
- Data Analysis
- Time Management

The need for these skills emphasizes the fact that we do not need more of the same education, we need a shift from teaching students what to learn to teaching them how to learn, think and creatively solve problems. The greatest gap in technical skills is seen in the skilled trade. Employers worldwide are finding it difficult or impossible to find skilled electricians, carpenters, plumbers, welders and mechanics. Vocational training is an effective means for addressing this skills shortage. The rate of enrolment in vocational and technical courses in high and higher secondary schools remains low. This needs to be raised.

Business grows and thrives where skilled workers are available. Vocational training and internship programs similar to those in South Korea and Germany will be a powerful catalyst for economic development in every country. An investment of public and private funds in a massive global program of vocational training and skills development will provide a reliable foundation for continuous economic growth, higher living standards and full employment. Computerized vocational training programs can be a cost-effective means to address the shortage of some skills. Entrepreneurial farm schools established on farmers' fields can double crop yields and productivity. Basic reading skills can be successfully introduced even at the kindergarten level by adopting low-cost methods.

– S. S. Sreejith
CEO, Global Institute of Integral Management Studies, India; WAAS Associate Fellow; Member of the Board of Directors, WUC

Why is Education the Key to Sustainable Development of Society?
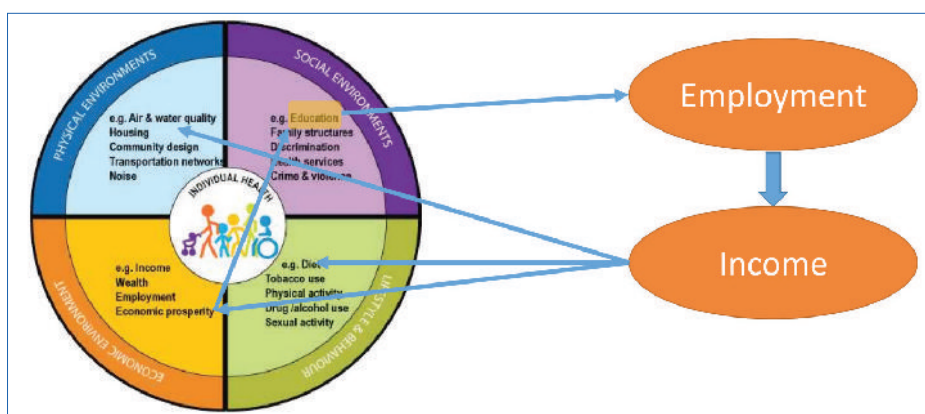
Inequality in access to education creates social inequality and this leads to social and political tension. Education, Inclusiveness and Sustainability are like a chain where the weakest link determines the end result and environmental effects.

– Petar Bulat
Vice-Rector, University of Belgrade, Serbia

Education for Sustainable Entrepreneurship

Traditional entrepreneurship concentrates on quantitative combinations of financial, productive and human capital. Sustainable entrepreneurship entails a turn from capital-centered to human-centered development, activates the infinite human potential for an increase and a more equal distribution of societal wealth, and creates more employment, all of which have a direct link to a more democratic society.

Educating for sustainable entrepreneurship enables large populations to participate in political and economic governance and enhance the integration of the legal and legitimate interests of the population.

– Erich Hoedl
WAAS Trustee

Collaboration: Key to building ecologically sustainable and socially just societies

The global goal of education is to raise individuals who can communicate, comprehend and feel empathy for each other.

– Marco Vitiello,
Department of Political Sciences, Roma Tre University, Italy; WAAS Junior Fellow

Vocational Training in India

As India's economy grows, there is an urgent need to produce technicians of international standards to meet industry's rising demand for skilled manpower. However, the vocational education stream in India is quite small. The enrolment rate of students at the high school level and above is 5.5%, whereas it is 17% in China, 24% in France, 29% in Italy, 65% in the UK and 80% or more in Switzerland, Denmark and Germany. A mere 5% of the country's workforce has received formal vocational training. So the Government of India has established a National Skills Development Corporation as a public-private partnership with the objective of imparting employable skills to 150 million Indian youth by 2022. The government has also announced a centrally-sponsored program to upgrade all Industrial Training Institutes with a view to producing technicians of international standards.

– S. S. Sreejith
CEO, Global Institute of Integral Management Studies, India; WAAS Associate Fellow; Member of the Board of Directors, WUC

Bridging the Skills Gap

Skills gap is a favourite bone of contention for the industry and academia. The two spheres are quick to blame each other. The industry points at the problem of reskilling, the inability of university graduates to innovate, the outdated knowledge and approaches that they demonstrate. Academia claims that the industry is not ready to cooperate: it is too closed, incapable of providing a clear list of competencies needed, and is reactionary. In the meantime, the storm is rising—the global and national labour markets and the very nature of work are changing. The first step towards addressing this change and solving the issue of skills gap is making the industry and academia work together. In this cooperation, the university can play a number of different roles: it can respond to the industry's needs; it can be a strategic partner; it can be a driver of change.

– Dara Melnyk, Skolkovo Education Development Centre, Russia

Educational Technology

Creating a World University

One of the surest and most reliable resources for the implementation of SDG 4 is technology. Technology offers an unprecedented opportunity to revamp and vastly expand the reach of higher education globally by adopting new models for educational delivery. It can revolutionize education as much or more than Gutenberg's printing press did in 1492.

All forms of learning enabled by information and communication technology—multimedia, internet, digital content, online tutoring, MOOCs (Massive Open Online Courses), and virtual reality—can be combined with the best of traditional learning methods. The resultant hybrid learning model is an effective system that can convert the SDGs on Education into a reality.

The education technology market is projected to grow at 11% annually and reach $341 billion by 2025. The global education market is estimated at $6 trillion, and has enormous scope for digitisation.

Mobile education is a natural step ahead given the great proliferation of cell phones. More than 40% of the people worldwide have a smartphone. Penetration ranges from 82% of the population owning a smartphone in the UAE to Bangladesh where the number is just over 5%. However, these numbers are on the rise, more so among youth (Half the children in America have a cell phone of their own by the age of 7). Delivering educational content through the smartphone is a smart and effective way of harnessing the power of mobile technology and multimedia.

One of the goals of the founders of the World Academy in 1960 was the establishment of an informal "World University" at the highest scientific and ethical level. Now it is possible due to the information and communication technology available today.

A virtual university can engage the highest quality instructors and educational materials to deliver high quality education at a fraction of the cost of current systems.

Formulation of comprehensive national or international delivery systems for internet-based secondary and higher education can dramatically transform education worldwide. While the cost and expertise for producing high quality multimedia instructional materials may be prohibitive for small countries or private firms, a global consortium such as WAAS or the World University Consortium, backed by national governments could elevate the quality of education globally to the highest levels now seen in the most advanced nations.

All these make the use of technology in education no longer an option, but a requirement for entry into the global community and economy.

– Heitor Gurgulino de Souza
Honorary President, WAAS; WUC President

Reinventing Universities

Rapid technological advances have been decisively influencing the process of traditional education. Students today are technologically literate and possess digital skills that allow for multimodal learning and instant access to knowledge. Their personalized learning model is: "We want to learn Anytime, Anything, Anywhere. At our pace, at our place."
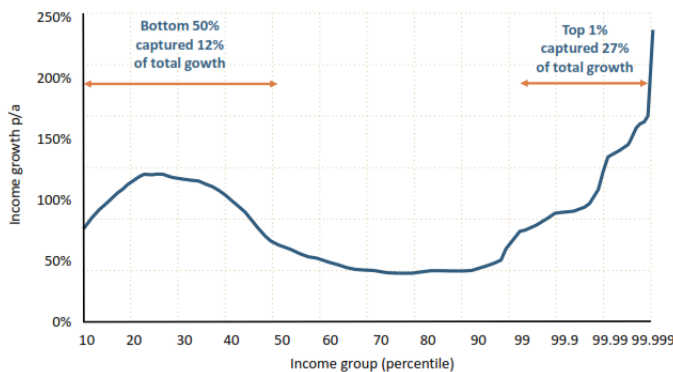
The evolution and extent of novel learning technologies, such as distance learning, MOOCs, collaborative environments, and virtual reality open up multiple pathways to flexible education. These developments urge universities to constantly reinvent themselves with the adoption of new technologies. Universities will have to offer more personalized teaching options and further explore the flipped-class model, by accepting and embracing the reality of ubiquitous and universal access to knowledge. At the same time, they must brace themselves for the next major disruptive technology (possibly the brain-machine interface), which may arrive sooner than we think and will be championed, not by a teacher, but by an entrepreneurial engineer.

– Pericles Mitkas
President, Black Sea Universities Network, Thessaloniki, Greece

In the Era of Endless Possibilities

Income (and wealth) concentration, 1980-2016

Inequality is rising

Bottom 50% captured 12% of total gowth

Top 1% captured 27% of total growth

Income growth p/a

Income group (percentile)

Source: WID. World (2017). See wir2018.wid.world/methodology.html for more details

Climate change and increasing inequality and income/wealth concentration in the hands of a few are the two most challenging problems the world faces today. This is inherently due to the wrong model of growth and outdated economic policies. Our earth as a system is not isolated but interconnected. Economists have increasingly become toys in the hands of politicians. This needs to change and can change. We now live in an era of the Fourth Industrial Revolution, an era of endless possibilities, and also endless threats.

– Dragan Đuričin, Faculty of Economics, University of Belgrade, Serbia

Blended Design Thinking

Digital tools can be used in blended learning scenarios as enablers to support the changes necessary to finally renew education and to ultimately tackle the SDGs. Blended learning can refer to combining digital and physical modalities and resources in classroom or other campus activities. It can also refer to combining the acquisition and the consolidation of both core and transversals skills. Tools considered in this framework include digital devices, mobile apps introduced to strengthen communication and participation, as well as agile cloud platforms supporting active learning.

EPFL's Graasp.eu is an innovative, free, and open access platform that supports personal, collaborative, and inquiry-based learning, as well as design and com-

putational thinking. Being agile is essential for such tools to enable seamless interventions initiated either by the students or the teachers. Teachers can create digital OERs that can be shared with colleagues and students. Students can create online shared spaces supporting, as an example, collaborative design thinking activities, hence contributing to at least three SDGs, i.e. quality education; industry, innovation and infrastructure; as well as partnership for the goals. The structure of the design thinking space available in the platform exactly matches the design thinking phases carried out face-to-face by the students, facilitating the blending between the digital and the physical modalities and activities. Courses implemented with this blended model have proven to be effective and attractive for students.

– Denis Gillet, Federal Institute of Technology in Lausanne, Switzerland

Democratization of Education

Technology democratises education and makes it inclusive. It facilitates life-long learning. It overcomes a range of limitations of the traditional classroom, and provides learning to people with disabilities and other constraints.

There are anywhere between 25 and 50 million refugees worldwide, half of whom are children. Technology can partly compensate for the lack of an organized education program for these displaced youth.

– Danielle Sandi Pinheiro, Associate Professor, University of Brasilia, Brazil; WAAS Junior Fellow

Gaming: The New Age Learning Tool

The Net Gens expect their learning environment to be interactive, personalized & customized, authentic, meaningful, co-creative, playfully explorative and entertaining.

– Tatjana Marković, Academy of Professional Business Studies, Serbia

Game-based learning

Resilience   Collaboration

Competence   Leadership

Creativity   Innovation

Impact of Digital Transformation on Creative Leadership Skills

All human knowledge generated and transmitted doubled in size around year 1500. It doubled again by 1750 (only 250 years), and doubled again by 1900 (just 150 years). With those rates, humans were able to adapt to the growth and change. It became harder to adapt when the doubling took 25 years around 1950. The knowledge doubling today takes much less time (around 13 months). Within the next decade, the knowledge doubling is expected to happen every 12 hours. It is not feasible for a human to adapt to that rate. Are we capable of finding a solution to adjust to that pace? How can we learn all that is needed in the old educational system?

The time has come to revamp the traditional educational system at its core, by using digital transformation in the right way. Many technologies like virtual, augmented, and mixed reality can enhance training and education. The new system must be personalized to match the diversity of individual abilities and styles of learning. The digital transformation is shifting the economy of atoms to the economy of bits. The economy of atoms is an economy of scarcity: atoms are limited; if you give an atom away you no longer have it. On the contrary, the economy of bits is an economy of abundance; if you give bits away you still have them. Technology is not just evolving our machines. It is creating a bridge between our machines and us. Biointerfaces are enabling seamless communications between our body, our mind and machines. This leads to the emergence of augmented humans, human 2.0, and transhumanism.

The first step is leading to augmenting the physical abilities of a person (imagine having a wavelength converter embedded in the eye that allows a person to see in the infrared or UV spectrum), then reaching a point where many persons are markedly different from natural people because of their extended capabilities. These could include specific "improvements like a permanent, seamless, connection to the web, made possible by advanced Brain-Computer Interfaces. This stage would characterize the development of human 2.0."

**– Rodolfo Fiorini
Academic Scientist, Politecnico di Milano, Italy;
WAAS Trustee**

Open Educational Resources

The Institute for the Study of Knowledge Management in Education, USA, founded by **Lisa Petrides**, leads the Open Educational Resources (OER) movement.

Digital libraries like OER Commons are built by creating, vetting, modifying and curating educational materials that are freely available to all. It not only makes high quality education affordable, but also creates a shift in teaching practice.

Adaptability of resources provides opportunities for personalized learning. OER increases collaboration among educators, aiding them in continuously improving instruction and implementing innovative ideas.

Need for Simulation Modelling in Complex Evolutionary Systems

The challenges facing humankind, recognized as 'wicked' problems, are interdependent; they are collective action problems; they involve aspirations for whole system change; they are dynamic, and involve future trajectories of the whole system; they are subject to unpredictable and continuous change.

The world must be seen as a complex evolutionary system that is subject to change and the emergence of unpredictable structures and whose future is in part determined by human choices.

What is needed to help us address the world's problems are tools that help us perceive the long term and systemic consequences of societal choices in an ever-changing world.

Such tools should focus on continuing exploration of future trajectories that are coherent with the laws of physics and other regularities as they are revealed by scientific endeavour.

It is then up to humankind to choose from amongst the possible trajectories and adapt our behaviour accordingly.

– Robert Hoffman
Co-founder and President of whatIf?
Technologies Inc., Canada; WAAS Fellow

Impact of Research & Innovation on Education

The most important impact of research on education is creating a new knowledge that helps us better understand our world, resolve existing problems and leads to a paradigm shift in one or more disciplines. It requires that the education system be open to new knowledge coming from both basic and applied research. Although new technologies do not shift paradigms in scientific disciplines, they make radical changes in human behaviour and activities, including in the education process. The Information Revolution has radically changed ways of communication, cut distances and through teaching platforms has provided students access to participate in courses at the world's best universities. Artificial Intelligence offers tremendous opportunities, including self-learning.

Taking into account the acceleration of knowledge generation combined with unprecedented dynamics of emergence of new technologies, there is an urgent need to shift the paradigm of education from still dominant passive knowledge transfer to active student-centered education by building learning communities where new knowledge is discovered. It is happening in the world's top universities but it is neither common nor easy to implement, and requires resources for overcoming many barriers and challenges.

– Zbigniew Bochniarz, Professor, Kozminski University, Poland & Evans School, University of Washington, USA; WAAS Trustee

Big Modelling and Action-driven Education

Global challenges present unprecedented governance issues and their management shows significant leadership and resource deficits. There is a need to put at the disposal of international, national and sub-national decision-makers and intervention operators novel modelling technological platforms embedded in innovative networking arrangements like action-driven education (EduAction). Big Modelling and EduAction coupled would not just support decision-making, but act as resource force multipliers.

The Big Modelling for Global Challenges initiative is creating a global 'collaboratory' that will bring together a critical mass of communities of computer modelling practitioners, researchers, educational institutions, both formal and informal, industry, and relevant global policy and governance stakeholders that co-create and operate disruptive management tools and networking arrangements to address 'wicked problems'.

Through embedding the Big Modelling collaboratory in EduAction, special emphasis will be given to engaging youth and women in novel ways to channel towards sustainability action the enormous energy that manifested itself recently when millions of young people participated worldwide in climate strikes demanding urgent action.

– Tibor Tóth
Executive Secretary Emeritus, Comprehensive Nuclear-Test-Ban Treaty Organization, Vienna; WAAS Trustee

Georgios Theodoropoulos
Chair Professor, School of Computer Science & Engineering, SUSTech, China

Integrated Thinking

Mind, Thinking & Creativity

Sixty-five percent of the children entering primary school today will eventually work in new job types that do not exist yet, according to the World Economic Forum's *Future of Jobs Report 2018*. So what can we teach children in our schools and colleges today to prepare them for a future that we do not know about, and can at best try only to anticipate or imagine? Rather than teach children what to learn, what to think, and how to solve a set of problems we present to them, we need to teach them how to learn, think and handle any eventuality they may face in the future. Original, holistic, integrated thinking is essential not only to prosper but to cope with and survive in the future.

Different types of thinking have different epistemological foundations and purposes. Analytic thinking is based on a positivistic, reductionist view of reality. It utilizes the mind's capacity to divide reality into categories, classifications, sectors, subjects, topics, specializations, components, parts and particles, and regards each as if it exists independently of all the rest. Such a view has generated precise knowledge of the parts, but obscured the complex interactions and interdependencies between elements that provide knowledge of the whole. The study of the individual elements as separate aspects of reality is useful and necessary for practical purposes. But when mistaken for reality itself, it introduces significant distortions and errors.

The insufficiency of analytic thinking led to development of more holistic ways of thinking founded on the capacity of mind to aggregate the fragments of reality conceived by analytic thinking in order to understand the interrelationships and interdependencies between the parts. Such synthetic thinking is a more inclusive type of thinking, but even that is inadequate to fully comprehend the intricate complexity of reality. Society, life and the world are an integrated whole. Every aspect and dimension is interconnected with all the others.

Integrality cannot be attained by simple aggregation and assembly of its constituent elements, nor can it be achieved by identifying the links between them. All knowledge seeks unity. The greatest discoveries in the natural sciences have been those that led to the unification of phenomena that had hitherto appeared to be unrelated to one another. Thus, Newton unified inertia and motion. Maxwell unified electricity and magnetism. Einstein unified space and time, gravity and acceleration. WAAS Fellow **Abdus Salam** unified the electromagnetic and weak nuclear forces. The capacity to identify relationships between apparently unconnected or contradictory phenomena is one of the defining characteristics of genius.

In order to facilitate integrated thinking and the development of genius, departmental structures and courses in our colleges should be reorganized around real-world problems and opportunities by integrating all dimensions of the issue. That will require an integration of social theories to evolve transdisciplinary social science founded on the common underlying social principles and processes that transcend disciplinary boundaries.

Finally it will require a shift in emphasis from exclusive development of analytic thinking that categorizes and compares, to synthetic thinking that embraces and connects different dimensions of reality, and integrated thinking which discovers their implicit interconnectedness and common underlying principles and processes.

"Sustainable Development" Need No Longer Be an Oxymoron

High levels of human development imply high ecological footprints and vice versa.

A key blind spot is to think of "us" and "them": we separate the environment and other people from ourselves and exploit them, as if we could disentangle the web of interdependencies which keeps life alive.

We split wholes into parts in a reductionist way. But reality is cybernetic, full with endless questions and responses, and our languages are too poor to grasp the richness of the world. This calls for a humbler perspective in which complexity and uncertainty are not problems but essential aspects of life. If we were ready to enjoy that, the space of future possibilities would grow bigger. Future education could focus then on endless processes of mutual learning.

– Carlos Alvarez-Pereira
President, Innaxis Foundation and Research Institute, Spain; Member of the Executive Committee, Club of Rome; WAAS Fellow

Holistic Education with 5 Elements

No matter whether it is in developed or developing countries, education has its own notions, i.e. Each individual is different; Each individual develops differently; Education's objective is to encourage a person to become holistic.

Following the pattern of development, we all start to "Imitate", then to "Learn", "Teach", "Coach" and finally "Innovate". To match with the development driving force, we start by imitating everything we sense, just like "Water" flows everywhere; then learn with pattern, that is "Wood" with branches and roots; then we teach with enthusiasm, that is "Fire" with energy; then coach with accommodation, that is "Earth" with absorption; then we innovate with disruption, and that is "Metal" with its sharp cut.

These five elements represent the mechanism of "Transformation": Water, Wood, Fire, Earth and Metal, and recycled to Water again. The "Controlling" or "Limiting" element goes in the following sequence: Fire (Teach) melts Metal (Innovate), Metal (Innovate) cuts Wood (Learn),

Wood (Learn) grows on Earth (Coach), Earth (Coach) stops Water (Imitate), Water (Imitate) eliminates Fire (Teach).

In this way, the curriculum will be designed based on "Needs" (Imitate, Learn, Teach, Coach, Innovate) in balance with each individual's life.

– Yi-Heng Cheng
Member, Club of Rome; Guest Professor at College of Design & Innovation, Tongji University, China

Realizing Humane Intelligence in Connection with Laws of Nature

Speech discloses not only the textual content of communication, it also gives us personal feedback on the level of connection or disconnection to the proper informatic realm of humans as established in natural law.

"Ethic-Talk" Technology, developed by Ethic-Talk Ltd., has used linguistic and psycho-physiological voice-based analysis of speech to develop a methodology and technology that helps the user become aware of previously subconscious trends; and to entrain and dramatically improve and upgrade his/her communicative and decision

making skills. This can empower everyone, (without distinction of age, race, status or social background), to realize his/her full Human Potential by improving communication, social and intellectual skills and to solve everyday communication problems: domestic, working, academic and professional environments.

– Liora Weinbach
Interdisciplinary Center for Health, Law and Ethics, Haifa University, Israel

Yehuda Kahane
Professor, Porter School of Environmental Studies, Tel-Aviv University; WAAS Fellow

Ernesto Korenman
Neurophysiologist, Bio-Physicist, and Expert in Bio-Neurological feedback, Israel

Education reform applicable to diverse developmental conditions

Rather than fearing the robotization of humans, we who invented technology in the first place should humanize it so it serves human needs.

Any educational reform must be contextualized in particular social and cultural traditions, values and worldviews, taking into consideration population size and demographic and developmental challenges, instead of introducing "one size-fits-all" models.

The successful Finnish experiment in Education Reform, which works well in the societal and cultural context of Finland, a relatively small and homogenous population, is to be critically explored for insights and not exported as a universal model.

We need to explore models of education in different countries for identifying both general features and country-specific features, as a foundation for building new Templates grounded in culture and political economy, as a way to implement Educational Reform applicable to diverse developmental situations and conditions.

The relationship between Multiculturalism and Interculturalism is demonstrated by the two vivid examples of historically-famous learning-research academies, The House of Wisdom of 9ᵗʰ century Baghdad and The House of Knowledge in 11ᵗʰ century Cairo, as that between form and process rather than polarized opposites.

– Fadwa El Guindi
Distinguished Alumna, The American University in Cairo, Egypt; WAAS Trustee

Education for the Anthropocene: How to prepare for unprecedented challenges?

The challenge of educating young people for the unprecedented challenges of the Anthropocene requires us to develop a new model of education, the "Geocentric Education". This model aims to safeguard human survival and avert the disastrous possibility of a collapse of civilised cooperation. Some key attitudes and insights need to be cultivated in students:

1. Stewardship implies respect for and protection of nature rather than an exploitative and controlling attitude. This requires identification with the whole of nature and life as our ultimate Self.

2. Integrated learning implies an awareness that most phenomena and contemporary challenges (such as the SDGs) are of a systemic, embedded nature and must be understood and addressed as such, using interdisciplinary and inter-sectorial approaches.

3. Collective wisdom needs to be fostered through education that gives learners ample opportunity to reflect and deliberate together toward the formation of shared values, priorities and future visions.

4. Sufficiency must be cultivated as a core value of the Anthropocene as we adjust our personal life habits to achieve wellness and happiness first, deprioritising material wealth and reducing resource use to a much more modest level.

– Thomas Reuter
Professor, Asia Institute, University of Melbourne, Australia; WAAS Trustee

Education in the 21ˢᵗ Century

If education is to play a role in solving global problems, it must transcend disciplines and become collaborative and flexible.

Creativity and innovative thinking are more valuable than rote learning of any depth.

Curricula must be integrated around topics that reflect patterns, interactions and interdependencies of different fields.

Liberal education in universities will help students develop creative thinking, communication skills, analysis and critical enquiry.

– Momir Đurović
Academician, Montenegrin Academy of Sciences and Arts, Podgorica; WAAS Trustee

Educating culturally different, environmentally responsible and globally aware citizens

Anthropology has an important role to play in preparing students for the future. The most important values of anthropological perspective are holism and the value of cross-cultural understanding and respect. Courses in Anthropology can be introduced into non-university education through two new courses, "National Cultural Heritage" and "World Cultures", in both elementary and secondary schools. In parallel, other existing core curriculum classes, such as history, geography, national language with literature, art and design, music education, and physical and health education, should be enriched with content related to "national" and "global", as well as "traditional" and "modern" cultures.

– Vesna Vučinić
Professor, Faculty of Philosophy,
University of Belgrade, Serbia; WAAS Fellow

Global Understanding—A New Paradigm for Education

Over the last few decades, everyone's geographical living conditions have changed dramatically. Long-established geographical world-views of regions, countries and continents are losing their social, cultural and economic unity. Rules of time and space no longer apply. Mastering global challenges calls for a global understanding of life and living conditions everywhere. This calls for a paradigm shift in education that will enable learners to understand the global interconnectedness that transcends mere increase in communication. Understanding our natural, cultural, social and economic global interconnectedness is key to this new paradigm of education. We need an education that inculcates hybrid thinking on local challenges and their global impacts while instilling global citizenship values.

– Benno Werlen, UNESCO Chair on Global
Understanding for Sustainability, Friedrich
Schiller University of Jena, Germany

Role of Education in the Implementation of the SDGs

The adoption of the SDGs by UN member-states is an unprecedented achievement. The fact that it has united 193 countries in agreeing on common goals for the whole world itself is remarkable. Yet, goal-setting is only the first step.

Implementing the SDGs successfully in the coming decade requires integrated thinking at the highest level.

Extensive research on technological, economic, social and political factors that will determine the level of success is required at the national level. At the international level, it will require unprecedented levels of cooperation between global and national agencies.

The SDGs are interdependent on one another. None of them can be achieved independent of improvements in the others. For instance, curbing economic growth to reduce carbon emissions is in direct conflict with efforts to achieve full employment and social security.

Extensive research is required to understand the interrelationships and interdependencies between these goals and the most effective strategies to achieve them in a mutually reinforcing rather than mutually conflicting manner.

Successful achievement of the SDGs will require a radical change in public perceptions, attitudes and culture which cannot be achieved solely by changes in law and public policy.

It can only be achieved by awakening and releasing the energies of the population based on a clear, integral vision of a better, more secure future for all humanity.

Such a thought process in our adult population must be preceded by fostering and facilitating integrated thinking in our youth.

Educational institutions have a key role to play in the process and consequently, in the successful implementation of the SDGs.

Multiculturalism and Common Values

Common values are required in a multicultural society. Multicultural limits are a complex issue, and can result in the imposition of a particular culture and values. But some basic values can be accepted as universal in areas like the course of law, acceptance of race, sexual orientation or age, gender equality, religious freedom, sustainable consumption, environmental protection, cultural diversity and peace.

After all, Vasudhaiva Kutumbakam, **meaning that the world is one family**.

– Saulo Casali Bahia
Professor, Federal University of Bahia, Brazil; WAAS Trustee

Interdisciplinarity and the Future of Social Sciences

The future of social sciences and humanities lies in interdisciplinarity, a close cooperation with the natural sciences, and cooperation within the entire academic community.

– Dragan Simeunović
Professor, Faculty of Political Sciences, University of Belgrade, Serbia

Aleksandar Vlahović & Heitor Gurgulino de Souza

Branislav Vujović & Vladan Devedžić

Oksana Sliusarenko

Kakha Shengelia

Anna Canato

Antonio Freitas

Special Lectures

Rainbows as Complex Phenomena

Meteorological rainbows appear in scattering of sunlight from water droplets in the atmosphere, and crystal rainbows occur in transmission of ions through crystal channels. The former effect comprises the primary and secondary rainbows—the bright circular bows seen in the sky at the angles of about 42° and 50° degrees relative to the horizon, respectively, and the supernumerary rainbows—the bright circular bows appearing on the inner side of the primary rainbow. The essential characteristic of a meteorological rainbow, as of all other types of rainbows, is an abrupt change in the intensity of scattered radiation across the rainbow angle, i.e., toward the inner side of the primary rainbow and the outer side of the secondary rainbow. The supernumerary rainbows are explained via the interference of scattered light rays. The crystal rainbow effect appears as a result of the interference of contributions of the crystal's atomic strings to the intensity of transmitted ions. The inner side of the rainbow line is the bright side of the rainbow and its outer side, the dark side of the rainbow. Both phenomena are catastrophic, meaning that they can be accurately modelled by catastrophe theory, and they are complex. In the former case, the sign of complexity is the emergence of the supernumerary rainbows, while in the latter case, the sign of complexity is the emergence of the rainbows themselves. That is a demonstration that complex phenomena can be successfully modelled and fully understood.

– Nebojša Nešković
Secretary General, WAAS; President,
The Serbian Chapter of the Club of Rome

Confucian Education as Civic Education

From its early conception, the Confucian project has primarily been educational in character, with its purpose being to prepare and help people live virtuous and productive lives. In the Confucian view, one is not born fully human, but has to become cultivated for realizing humanity. In such a process, education occupies a central place. In ancient times, the Confucian educational curriculum consisted of the "six arts", namely rites, music, archery, charioteering, calligraphy, mathematics. Along with these skills are the Six Classics: *Book of Poetry*, *Book of History*, *Book of Change*, *Book of Rites*, *Book of Music*, and *the Spring and Autumn Annals*. In the contemporary democratic age, the mission of education focuses on civic education, aiming to empower citizens and to equip them with knowledge and learning experiences for effective participation in society's democratic processes. Confucian moral philosophy, which is largely secular and this-worldly, is particularly suitable for civic education in equipping citizens with civic knowledge, civic skills and civic disposition, preparing them to be effective citizens in democratic society. The Confucian concept of education has a role in making all-rounded persons. Civic education is a collaborative social effort in contemporary times. Therefore Confucian education has a role in democratic society and its endeavour to achieve its goals.

– Chenyang Li
Nanyang Technological University, Singapore

Perfection in Science

The United Nations and UNESCO proclaimed 2019 as the International Year of the Periodic Table of Chemical Elements. Russian scientist Dmitri Mendeleev discovered the Periodic System 150 years ago. The Periodic Table is an exceptional tool for students as well as scientists to understand the properties of all the chemical elements. The table has nearly doubled in size from the 63 elements when Mendeleev discovered it. Now the table looks complete, and has taken a perfect shape. It has seven rows, with all the elements in them known and named. This is the first time in the history of science that the table has achieved such perfection, and we hope for a greater future for Chemistry and the role of science in the world.

– Alexander Karpov, Flerov Laboratory of Nuclear Reactions,
Joint Institute for Nuclear Research, Dubna, Russia

Education for the Future

Bringing all Stakeholders together to Build the Future

With 7 laboratories each the size of a large institute in terms of scale and scope of research, 5000 staff members, and 800 partner organizations in 62 countries, the international intergovernmental organization Joint Institute for Nuclear Research (JINR) is the second biggest research organization in the world. The research institute brings global students to the facility, imparts training for teachers, conducts outreach programs and offers courses for skill improvement. This ensures the effective use of JINR facilities and expertise, trains highly qualified scientists and engineers from the member states, and brings up-to-date scientific knowledge to the general public. Over 500 English and Russian lectures by JINR researchers are available online, the institute also has available a virtual laboratory. By bringing students, scholars, teachers, decision-makers and general society together, JINR facilitates inter-disciplinarity, multi-culturalism, and academic mobility. In the process, it also creates the necessary space for generating new ideas, fostering creativity and building the future.

– Dmitry Kamanin
Head of the Department of International Cooperation;
Joint Institute for Nuclear Research, Dubna, Russia

Universities must Nurture Deep Thinkers

Our graduates need to be skilled for a profession. But more importantly, we need youngsters who can think and solve problems, "a certain cultivation of the mind and character" is essential as Wilhelm von Humboldt said. We need deep thinkers today.

Thinking, and reading that supports thinking are challenged by technology that is reducing students' attention span. Deep reading improves the brain's ability to comprehend, analyze and evaluate information. It helps with fluid intelligence, comprehension and emotional intelligence. But a big challenge to educators today is the handling of students who are already shaped by the digital world. Are our students today, who are used to other forms of communication, able to follow us in the classroom?

We need to create an interest in our students, but a typical lecture by a traditional professor is not the way to reach the current student audience. Every university is trying to position itself so as to handle change and transform itself to meet the current needs of students and society. But we do not know what the future will be like, so we find ourselves transitioning into the unknown. We need to eqiup our youth with generic, basic knowledge that will enable them to adapt to any future. An active, inter-disciplinary, problem-based learning method will help in this process. The University of Belgrade is a comprehensive research-intensive university that takes seriously its responsibility to develop in students the capacity for deep thought.

– Ivanka Popović
Rector, University of Belgrade, Serbia

Power of Combining the Emotionale and the Rationale

Art is the irreducible part of education. We learn as much by Emotionale as by Rationale. In line with this principle, a musical concert was organized as part of the Conference. The program, held on the night of November 12, 2019 in the Atrium of the National Museum in Belgrade, was inaugurated by **Aleksandar Gajović**, State Secretary in the Ministry of Culture and Information of the Republic of Serbia.

For a long time, there was only the human voice. Centuries passed before man desired to sing and praise God in the early shrines. The first writings of the chants from shrines and monasteries were spread, acknowledged and adopted around the world. One such, written by Kir Stefan the Serb, *Taste and see*, was performed by Dragoslav Pavle Aksentijević and his group. The desire to explore and learn has driven mankind to travel far. Much of the knowledge Marco Polo brought back from his travels was widely accepted throughout Europe. That is how the music of the Far East was introduced in Serbia. A song from the Laudario di Cortona, *Come and celebrate*, and a traditional instrumental piece from China, *Waves washing the beach*, were performed by the Renaissance Ensemble. These were followed by a traditional song from the imperial city of Prizren, Kosovo and Metohija, Serbia. Man learned how to make music with his hands using sea shells, horns and flutes. Today, we listen to symphonic orchestras. We enjoy stirring monodies as well as exciting choral compositions. The Belgrade Chamber Choir performed two compositions: *A prayer of David*, by Vladimir Milosavljević, and *O Lord, save Thy people*, by Pavel Chesnokov. Performing solo were Radmila Vladetić Ivanišević in the first piece, and Goran Krneta in the second.

Much time passed between the invention of the wheel and of the steam engine. It took less time to make the leap from steam engines to nuclear power plants, and from x-ray imaging to gamma-knife surgery, and even less time from the first space flight by Yuri Gagarin, to interplanetary missions. Our future is uncertain—we speculate on it. This is why the Conference on Future Education was held—to contribute towards the establishment of a new educational system, one that will enable humankind to take control of its future. With this conclusion and the composition *Holy God* by Pyotr Ilich Tchaikowsky, the artistic program came to an end.

– Nebojša Popović
Belgrade Chamber Choir, Serbia

Presentations made at the Conference

Challenges and Opportunities Impacted by New Normalities

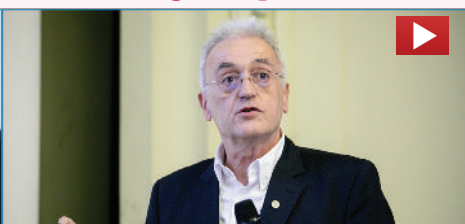**Ana Brnabić**   **Heitor Gurgulino de Souza**   **Aleksandar Vlahović**

Inaugural Speeches
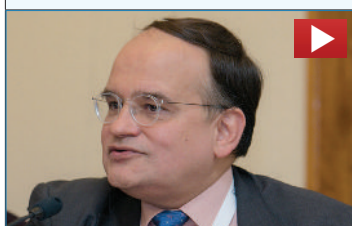
Garry Jacobs   **Nebojša Nešković**   **Vladimir Kostić**

Strategic Audits of New Education Challenges and Opportunities

Carlos Alvarez-Pereira   **Ivanka Popović**   **Kakha Shengelia**   **Dragan Đuričin**

Rapid Evolution of the Educational System: Impacts of Science, Technology and Politics

Danijela Kirovski   **Patrick Degeorges**   **Momir Đurović**   **Benno Werlen**   **Carlos Blanco-Pérez**

Educating Culturally Different, Environmentally Responsible and Globally Aware Citizens
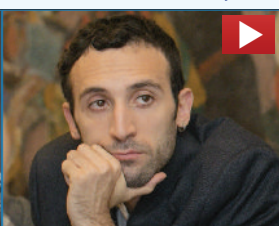
Thomas Reuter   **Saulo Casali Bahia**   **Ljiljana Marković**   **Marco Vitiello**   **Vesna Vučinić**

Getting Out of the Box in Education: Fostering Creative Thinking and Innovation
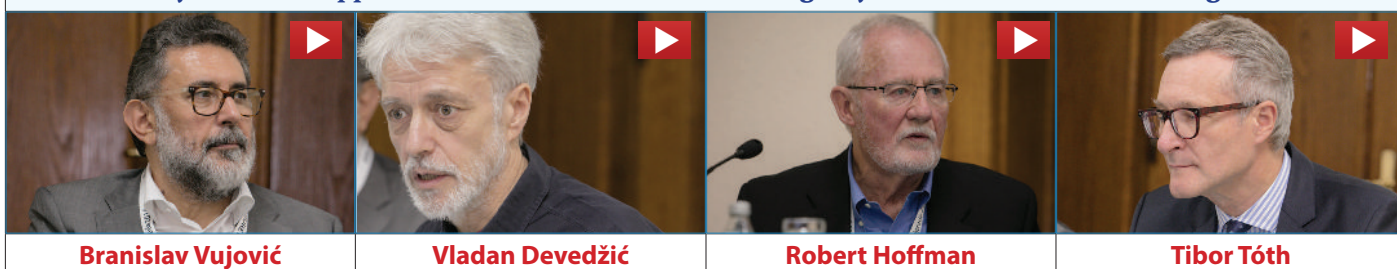
Dragan Simeunović **Carlos Alvarez-Pereira** **Nora Bateson** **Tatjana Marković** **Goran Pitić**

Digital Opportunities at All Educational Levels

Rodolfo Fiorini **Mariana Bozesan** **Alberto Foletti** **Veljko Milutinović**

Roles of Academic Mobility and Digital Tools in Research and Education

Dejan Popović **Denis Gillet** **Danielle Sandi Pinheiro**

Hybrid and Flipped Educational Models: Combining Physical and Virtual Technologies

Branislav Vujović **Vladan Devedžić** **Robert Hoffman** **Tibor Tóth**

Social and Humanistic Sciences in the Era of the Fourth Industrial Revolution

Goran Bašić **Dejan Molnar** **Paul Spierings** **Branko Urošević**
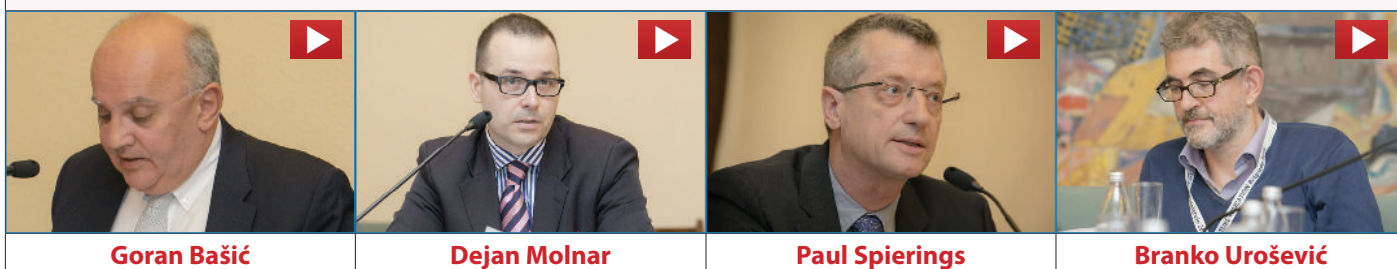
New Education: From Leadership in Thought to Effective Action

Anna Canato
Nebojša Lalić
Tibor Varadi

Impacts of Research and Innovation on Education

Zbigniew Bochniarz
Francesco Arcidiacono
Vladimir Popović
Branislav Jelenković

Contextual Knowledge: Building Bridges between Disciplines for Relevant and Effective Learning

Olivia Bina
Slobodan Grubačić
Blagoje Paunović
Janani Ramanathan
Liora Weinbach

## Effects of Dual Education at Different Levels

Yi-Heng Cheng
Sue Henderson
Mirjana Kovačević
Mladen Stamenković
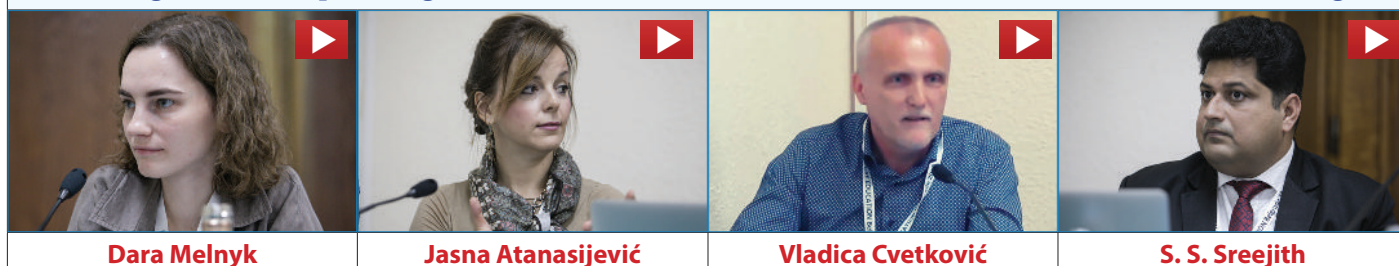**Matthias Straub-Fischer**

Education for Full Employment

Enrico Giovannini
Garry Jacobs
Marcel Van de Voorde
Erich Hoedl

Interdisciplinarity in Digital Scholarship

Smiljana Antonijević   **Ivan Maksimović**   **Bojan Đokić**   **Andreas Riepl**   **Milena Stanković**
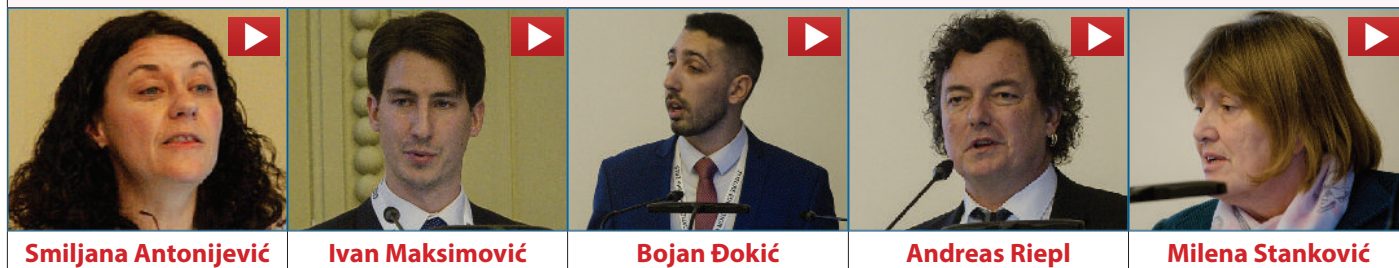
Closing the Skill Gap Through Education: Roles of Academia and Unconventional Forms of Learning

Dara Melnyk   **Jasna Atanasijević**   **Vladica Cvetković**   **S. S. Sreejith**

Education for Sustainability and Inclusiveness for People and Nature

Petar Bulat   **Mariana Bozesan**   **Aleksandra Drecun**   **Radmilo Pešić**

Person-centered Education

Alberto Zucconi   **Anne Snick**   **Anantha Duraiappah**   **Stefan Brunnhuber**

Shift from Subject-centered to Student-centered Education

Lisa Petrides   **Jovan Despotović**   **Pericles Mitkas**   **Davide Scalmani**   **Vani Senthil**

Learning by Collaborating

Aleksandar Baucal

Jorge Gimeno Pawlowski

Emily Caughman

Tanja Ranković

Dmitry Kamanin

Value-based Education

Ullica Segerstrale

Milena Dragićević Šešić

Mila Popovich

Charis Psaltis

Oksana Sliusarenko

Chosen Themes of Interest for Future Education

Nebojša Nešković

Alexander Karpov

Fadwa El Guindi

Chenyang Li

Conclusion

Reports on Panel Discussions

Garry Jacobs

Ivanka Popović