THE UNIVERSITY OF RIJEKA

THE CROATIAN ACADEMY OF SCIENCES AND ARTS The Department of Biomedical Sciences in Rijeka

UNIRI COVID – 19 MESSAGES:

CONCLUSIONS AND RECOMMENDATIONS





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Inter - disciplinary scientific conferences COVID-19 MESSAGES Rijeka, September – November 2020

The scientific community, alongside other social stakeholders, is currently centered on finding the solution for the global crisis caused by the COVID-19 coronavirus pandemic. Current research focuses primarily on biomedicine, healthcare, and the natural sciences, where scientists endeavor not only to understand the nature of the virus, and to develop a vaccine but to explore the value and the future role of public healthcare in preventing disease and protecting citizens. No less mobilized are researchers in other branches of science. Experts in the social sciences are examining the social consequences of this global shock, especially concerning the field of education, which has undergone an unprecedented technological transformation. Comparable activities can be seen in the areas of legal, economic, and sociological scholarship, in political science, and in the humanities, which are now reflecting upon the threats, challenges, and opportunities linked with building the new world order. For experts in the technical sciences, this crisis has posed the critical questions of the future development of informational communication technologies, artificial intelligence, and cybernetic security. Research in energetics and sustainable development is pushing new frontiers. Emergency communication in the world of social networks, and trust in experts, institutions, and leaders, have emerged as the most important of topics. It seems as if the absolute social shock that has struck the world requires new and exhaustive research that transcends strict disciplinary boundaries, and, more urgently than ever, demands a multi-disciplinary or inter-disciplinary approach, alongside intense global collaboration. Our students – future researchers and the future citizens of a better world – are, along our side, reflecting upon the challenges of a new mobility, new engagement, new communication, and new socialization. We have found ourselves in an unique social moment that has us question the whole of science and the potential of scientific research to improve all segments of society, and the quality of life of citizens throughout the world.

We are facing today the dilemma of whether this crisis will be fleeting, and have us return to our "normal" lives, or whether it will cause irreversible changes to our way of life in some "new normal." Scientists at the University of Rijeka have followed all responsible and progressive researchers and citizens in wanting to deliberate about a genuinely brave new world, which we are now in a position to build. The COVID-19 MESSAGES scientific conference and its program were organized and designed by the University of Rijeka and the Croatian Academy of Sciences and Art, The Department for Biomedical Sciences in Rijeka. The conference had the form of a cycle of five daylong scientific gatherings that took place in the period from September to November 2020. Each meeting was dedicated to scientific research from four different areas - biomedicine, education, technology, social sciences and humanities - as well as students' perspective on the pandemic's consequences. The final, fifth meeting enabled students to voice their dilemmas and reflections upon the future of higher education and society at large. Before the beginning of each session, a book of extended abstracts was published. Finally, following the end of the cycle, we produced also this document titled UNIRI COVID-19 MESSAGES AND RECOMMENDATIONS, which contains our conclusions about the direction and importance of further scientific research and social agency.

By publishing UNIRI COVID-19 MESSAGES AND RECOMMENDATIONS, the University of Rijeka - supported by Croatian Academy of Sciences and Art, The Department for Biomedical Sciences in Rijeka - wants to contribute to the exchange of ideas that aims to make us more apt at tackle the COVID-19 pandemic, and to stress the University's devotion to our public mission of social responsibility.

COVID 19 MESSAGES I: ADVANCEMENT IN VIROLOGY RESEARCH – AN OPPORTUNITY TO IMPROVE INTERNATIONAL IMPACT OF THE UNIVERSITY OF RIJEKA Rijeka, 24th Se^{tte}mber, 2020

This first conference aimed to analyze the position of Rijeka virology and immunology in the Croatian and international environment, with emphasis on the COVID-19 pandemic. In the past 30 years, a strong scientific and technological infrastructure has been created that enables research at a high international level, a significant number of mature and young scientists in these scientific disciplines have been affirmed, successful cooperation with many world centers of scientific excellence has been established, and numerous national and international (European and American) projects enabled the employment and affirmation of young talented researchers. Numerous scientific discoveries have been published in the world's leading scientific journals, and the citation rate of these papers is impressive.

In immunology and virology research, today Rijeka is the leading center in Croatia, and research is conducted at the Faculty of Medicine and the Department of Biotechnology of the University of Rijeka, as well as the Clinical Hospital Center (KBC) Rijeka. The Faculty of Medicine is the 'home' of the Scientific Center of Excellence for Viral Immunology and Vaccines. There have been a dozen patent applications (two have already been granted), and with the establishment of a spin-off company, academic entrepreneurship has also begun. All these results significantly contribute to the international recognition of the Faculty of Medicine and the University of Rijeka.

Based on the analysis of these achievements, and discussions in the context of shortterm and long-term challenges that the COVID-19 pandemic actually and potentially bring to the entire society, science, and the University, the following recommendations should be taken into account:

- 1. It is important to systematically continue to develop a high-excellence and worldrenowned scientific research potential, capable of participating equally in international research projects and programs. Only such potential can ensure the ability of quick adaption to research challenges such as the COVID 19 pandemic. The projects approved in the first tender of the Croatian Science Foundation for funding SARS-COV-2 and COVID-19 research should be considered as a paradigm of possible similar responses to emerging infections in the future for which we must be prepared.
- 2. The COVID-19 pandemic highlighted the importance of an interdisciplinary research approach. The cooperation between fundamental and clinical medical sciences (Faculty of Medicine and Clinical Hospital Center), public health (Teaching Institute of Public Health of Primorje-Gorski kotar County), biotechnology (Department of Biotechnology and other University departments), and the pharmaceutical industry in Rijeka should be bound to create a strong research cluster. The devastating effects of the COVID-19 pandemic on society as a whole and the economy have shown that research potential in the fields of social sciences and humanities, technology, and ICT needs to be developed in parallel.

- 3. The already built scientific infrastructure and the created research potential require us to maximize our efforts (lobbying at all levels of society) in the development of the Center for Translational Medicine (TransMedRi), as was also recognized by the European Commission, which financially supported the project and program basis for the Center. This project has been included in the Development Strategy of the University, the City of Rijeka and the Primorje-Gorski kotar County and is part of the smart specialization program of the Faculty of Medicine, the University, the City of Rijeka and the Primorje-Gorski kotar County. The construction of the Center for Translational Medicine is a joint task of the University, the Faculty of Medicine, and the Clinical Hospital Center Rijeka, and is part of the health and science complex in the interface of the University Hospital and the University Campus.
- 4. As part of the research infrastructure for biotechnological research, **it is necessary to complete the construction of the vivarium for laboratory rodents** (specific-pathogen-free or SPF) in the building of the University Departments as soon as possible.
- 5. It is necessary to continue to strengthen scientific potential through a designed and purposeful development of research careers of top excellence and retain our best young scientists, but also to attract scientists of proven scientific excellence from other centers in the country and the world (especially the Croatian diaspora).
- 6. **Special attention should be given to the scientific education of clinical scientists.** Young clinical scientists should spend part of their training in a research laboratory, before and/or during specialization. It is therefore important to encourage the transfer of knowledge into clinical practice through the cooperation of research groups with appropriate clinics and teaching bases.
- 7. There is a need to encourage the development of small companies based on the acquired scientific knowledge and include the University of Rijeka Science and Technology Park (Step Ri) in cooperation.
- 8. Scientific achievements that have significantly contributed to the reputation of the Faculty of Medicine and the University have not been accompanied by adequate education of students of medicine and biomedicine. A significant number of researchers have earned scientific and scientific-teaching qualifications and need institutional support through the establishment of new organizational units at the Faculty of Medicine and/or the University (e.g. Department of Virology, etc.). That would allow for the competent research potential to be retained in Rijeka, and at the same time, ensure quality education of students of various undergraduate, graduate, and doctoral study programs and clinical sub-specializations. The field of virology would thus provide the Faculty of Medicine, the University, and clinical medicine additional international recognition and one of the most significant features.

COVID-19 MESSAGES II: HIGHER EDUCATION IN COVID-19 CRISIS: CHALLENGES AND OPPORTUNITIES Rijeka, October 6th, 2020

In the spring of 2020, almost overnight, our everyday education underwent great changes due to the COVID-19 pandemic. As any other crisis would, it has risen numerous questions about the ability to adapt to organizational and logistic issues of online teaching and learning, but it has also allowed us to rethink the future of higher education as well as to act upon it. As higher education stakeholders, aware of the role higher education plays in the personal growth of every student and therefore is responsible for shaping our future society, we draw the following conclusions.

- 1. Problem with the higher education system, emphasized by this crisis, ought to be addressed publicly, to be accepted by society as equally important as personal and public health issues caused by the COVID-19 pandemic, both in terms of financing as well as general societal support.
- 2. Es of great importance to promote the narrative of the values which digital transtormation of higher education brings to society, both in terms of rethinking and designing the future of higher education as well as for assuring the future quality of life in society.
- 3. It is not sary to inform all stakeholders that a change brought about by the COV-ID-19 crisis, along with the transformation of higher education, is irreversible. In such conditions, change is not only an opportunity but a necessity.
- 4. The COVID-19 crisis point ed to the values of national support services (infrastructure, logistics, educational support to academic staff, students, etc.) as precious resources in online teaching and communication with students. Their existence and further development should be strongly supported.
- 5. Universities' management should think long-term, but act on a short-term basis; COVID-19 clearly shows that the situation can change rapidly, therefore our system needs to be much more flexible. Universities of the future are institutions which constantly learn learn how to adapt and how to plan for the future.
- 6. Shaping the future is higher education should take into consideration a combination of bottom-up and top-down approaches to develop agile digital scholars, equipped and competent for teaching in the digital era. While the bottom-up approach should value and utilize the 'learn-from-colleagues' principle, the topdown approach should constantly take care of the professional development of human resources in academia.
- 7. The future of higher education lies in the strong net -institutional cooperation, not only between universities but also with other stakeholders from the region, allowing to build stronger ties between academia and society.

- 8. The student journey of tomorrow should be a pers in lized study experience supported by physical and virtual mobility, allowing the development of networks and communities of practice. By supporting the academic environment and taking the responsibility for one's personal development, students should acquire the basic set of skills needed for the future autonomous learning, self-organization, creativity, and innovation as well as intercultural competencies.
- 9. The University of Rijeka shall use the experiences and lessons learned from the COVID-19 crisis to shap the accompanying policies of the new University Strategy for the period 2021-2 . This especially refers to the segments of development of digital transformation of the educational process, development of a framework for the advancement of teaching competencies (particularly for learning and teaching in the virtual environment), development of a system for continuous curricula development (especially in the segment of cooperation with companies, entrepreneurs, local community, and civil society), as well as active participation in the development of the European University YUFE (Young Universities for the Future of Europe) and open study programs developed by the network.

COVID-19 Messages III: STEM FOR HUMAN SPECIES SURVIVAL Rijeka, October 22nd, 2020

The main goal of the COVID-19 Messages III was to answer the question of how STEM helped us confront the pandemic, what can be done by scientists and engineers in the future, and how will science and technology evolve faced with new challenges. On a deeper level, it was necessary to get a much broader view, not only from the STEM standpoint but from an anthropological standpoint as well. We are now required to step back from the present and take a look at humankind's path, history, and future, to remind us that we are all one species and a rather unique one. Like any other species, we have a very strong survival instinct, but in comparison to other species, we have a completely different set of tools to achieve that goal. Our tools are not just the ones given and predefined by biology. Mostly they are our non-biological extensions; like the stones first humans used to light the fire or spears used for hunting; like our cars, airplanes, and buildings that reflect our strength and velocity, or the books and the computers that extend our memory and communication reach. These are our superpowers, and they are mostly products of STEM. Therefore, science and technology are our most powerful survival tools - tools used for manipulating whatever conditions, tools that allow us to improve our existence and ensure our survival through millennia. The lecturers and participants of this third session managed to surpass this intention, and provide encouraging information and ideas briefly outlined in the following conclusions.

- 1. We can and should evolve to a multi-planet species. The technologies used for colonization of planets or satellites in our Solar System are already here, but to discover far more distant places in the universe discoveries are needed, and we, humans, have proved to be very good at. We must pursue this goal, as only diversification of the places and conditions in which human civilizations can ensure our longevity in the universe.
- 2. We must transform the industry and economy to preserve our precious planet. Sustainable energy is already cheaper than fossil fuel, and we need to introduce economic and political measures that will help the petroleum industry transform into a nature-friendly industry, building power plants, and using renewable sources. Other ways of preserving our planet, like the impoverishment of the population or slowing down technological development, are not acceptable.
- 3. We can and must use artificial intelligence and IT for the benefit of all humans. Artificial intelligence (AI) can be used in many ways that significantly improve our everyday life: AI as health assistants, block-chain technologies for greater security, machine learning (ML) algorithms that discriminate between true and fake news, IT tools that free us from repetitive and boring jobs, etc. Possible violations of human rights and privacy and unequal access to innovations represent the real threat, and not some army of super-intelligent enemy robots – for now, they exist only in movies.

- 4. STEM is particularly important as it enhances the ultimate survival skill prediction. Our brain is essentially a prediction machine, science improves that skill, and modern mathematical and computational algorithms and increased computer power bring such skills to a completely new level. Applications of new algorithms in virology and epidemiology help us fight COVID-19 and any similar challenges in impressive new ways. Computer simulations of possible realities and outcomes give us the answers needed to make the right decisions for a better future.
- 5. **STEM should be used for the survival and growth of the human species.** STEM produces tools that can be used for our growth as well as our destruction. To always be able to make the right choices, one needs additional knowledge and other concepts and ideas, particularly those from social sciences and humanities.
- At the University of Rijeka, physicists take part in the work of consortiums that 6. explore mysteries of the universe, scientists are dedicated to the pursuit of energy-efficient and sustainable solutions, discoveries in micro and nanotechnology, high-performance computing (HPC) is applied, mathematicians develop discrete and applied mathematics, computer scientists create new big data and machine learning algorithms, apply them to biotechnological, technical, and other scientific fields. The quality of this scientific work can be further illustrated by the fact that 67% of papers produced by our scientists working in the field of life sciences and 35% of papers in the field of technical sciences are in the top 25% of publications in the world. Also, it is important to emphasize the collaboration with many scientists all around the world, and particularly with those from the Young European Research Universities Network (YERUN). This new European partnership is particularly important within the scope of our COVID-19 Messages as YERUN brings new perspectives and strengths in European academic discussions and ensures that scientific development is always for the benefit of individuals and society in general.

COVID-19 MESSAGES IV BRAVE NEW WORLD: DEMOCRACY, RIGHTS AND JUSTICE IN COVID-19 ERA Rijeka, November 12th, 2020

Scientists in the social sciences and humanities should be engaged in reflecting the global shock caused by the pandemic, the ways it has struck society, and its possible consequences. Although the pandemic caused by the coronavirus has emerged as an unprecedented biomedical challenge to public health, the conference's main conclusion is that scientists in the social sciences and humanities must be actively involved in reflecting upon the crisis, the avenues of recovery and in counseling decision-making authorities. Namely, we are confronted by many ethical, political, economic, legal, sociological, psychological, and communicational challenges that could provoke in the near future serious societal issues.

- 1. The pandemic has proven to be a reagent that has sped up changes that were already underway, such as the digital transformation of education and healthcare, the energy transition, artificial intelligence, and algorithmic predictions derived from big data. Far removed from futuristic concerns, these topics have become urgent challenges of the new normal that require focused multi-disciplinary considerations. Consequently, **University of Rijeka need to promote the international collaborative multi-disciplinary strategic researches with clear regional, national and international societal impact.**
- 2. Simultaneously, the pandemic has cast light on social problems that have been eroding democratic values for decades, threatening long acquired freedoms and human rights, and jeopardizing the rule of law. Economic consequences in the form of an expected recession and psychological traumas related to existential uncertainty make the situation more complex and solutions more challenging. The participants concluded that the end of the pandemic need not be confused with the end of the threats the pandemic has caused.
- 3. At the University of Rijeka, we are aware that times of crisis that accentuate society's fragility must also be times when those who know the most have a particular duty to divulge valuable long-time solutions and create a genuinely brave new world. Scientists, confronted with a crisis further encouraged by a culture of ignorance, have found themselves in circumstances of increasing distrust towards science, scientists, and the scientific method. The new University of Rijeka Strategy 2021- 2025 Toteds to emphasize that expertise must not to be perceived as elitism but as the best foundation for building democratic competences and human wellbeing.
- 4. There is no alternative to science and education, and University of Rijeka have to develop strategic partnerships with academic and non-academic institutions in promoting the idea of enlightenment, and the preservation of democratic values, freedom and human rights.
- 5. The main task of researchers at the University of Rijeka is to rebuild trust in science, strengthen responsible scientific communication, and encourage an interdisciplinary, problem-oriented scientific approach that supports civic wellbeing.

COVID 19 MESSAGES V: COVID-19 FROM STUDENT PERSPECTIVE: IMPACT, ANALYSIS AND RECOMMENDATIONS Rijeka, November 27th, 2020

The last in a series of online sessions aimed to reflect on the COVID-19 pandemic from the perspective of those who represent the majority in the education system, the students. The main task of the fifth session of COVID-19 Messages was to show how students responded to numerous challenges they are facing during the pandemic, as well as to share their reflections on the future of higher education and society as a whole. As there is not a single part of Europe that has not been affected by the pandemic, which greatly influenced almost all segments of social and private life, the goal of the fifth part of COVID-19 Messages was to give a broader student perspective, introducing students from Europe, especially students from YUFE (Young Universities for Future of Europe) Alliance. Not wanting to emphasize only the negative aspects of the pandemic, this session aimed to give an overview of all the successful adaptations and activities that resulted from these extraordinary circumstances. Society as a whole faced truly challenging and unprecedented times, and history teaches us that one can overcome difficult and challenging times only when cooperating and showing respect to others. The aim was to single out the various activities carried out by students and staff during the pandemic and to highlight the biggest challenges we are all facing. The participants of the conference achieved the following goals of the conference and with their presentations, comments, and ideas laid the foundation that must be utilized for the development of education but also society as a whole:

- 1. **Further development and improvement of the hybrid model of teaching.** The hybrid model of teaching proved to be a very high-quality form that enabled students to more easily follow the lessons and achieve learning outcomes during the pandemic. Although e learning cannot completely replace onsite teaching, further development and investment in e-infrastructure would provide students with numerous opportunities such as individualization of the study program and inclusion in the programs of other universities.
- 2. The need to encourage the volunteer activities of students and University staff. During the pandemic, students became involved in many volunteer activities to help those in need and those most affected by the pandemic (health professionals, at-risk groups). Volunteer work and cooperation with the local community should continue to be encouraged and nurtured at the University, to involve even more student activists who can be involved in various activities. Volunteering has immeasurable positive effects for all parties involved, and the further development of volunteer work actively contributes to the development of democratic competencies.
- 3. **Timely and unambiguous communication reduces stress and uncertainty**. Research conducted during the COVID-19 pandemic showed that one of the biggest challenges for students was the uncertainty caused by the pandemic, which permeated all aspects of life (studying, student life, professional training). Timely and

direct exchange of information between the University Management, the faculties, and the students, which informs the students about plans, procedures, and expectations, reduces stress, which leaves negative consequences on the results. Also, it is important to emphasize that students' communication with individual management boards is of extreme importance, allowing the students to articulate their needs and ideas to respond to individual challenges – not only during a pandemic but in normal circumstances as well.

- 4. The emphasis should always be on the process of learning. Achieving learning outcomes and acquiring competencies must be at the heart of all educational processes, regardless of the way they are performed. After the introduction of distance teaching, numerous public debates put the issue of academic integrity in the foreground, while the quality of the educational process and acquired competencies was kept in the background, as something currently deemed less important. Regardless of the circumstances, the emphasis must always be on learning and knowledge acquisition.
- 5. The pandemic must be used to develop and improve the education system. The circumstances caused by the pandemic provided an opportunity to improve the higher education and education system in general. Digitization has proven to be crucial in these times and this is an opportunity for higher education institutions to better position themselves and plan their development oriented towards the future, based on the experience gained during this period.