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XII International Conference on Mathematics, Science and Technology Education

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XII International Conference on Mathematics, Science and Technology Education

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Abstract. This paper represents a preface to the Proceedings of the XII International Conference on Mathematics, Science and Technology Education (ICon-MaSTEd 2020) held at the Kryvyi Rih State Pedagogical University, Ukraine, 15–17 October 2020. Background information and the organizational structure of the meeting, and acknowledgements of the contributions of the many people who made the conference a success are presented.

1. Background

The International Conference on Mathematics, Science and Technology Education (ICon-MaSTEd) is a peer-reviewed international conference, which covers research on mathematics, science and technology education, along with technology-enhanced learning, including blended learning, E-learning, ICT-based assessment, mobile learning etc.

Since 2001, ICon-MaSTEd is the premier interdisciplinary forum for social scientists, academicians, researchers, professionals, policy makers, postgraduate students and practitioners to present their latest research results, ideas, developments, and applications. There is urgent general need for principled changes in mathematics, science and technology education elicited by promising theories, models, tools, services, networks and communications.

The background theme for this ICon-MaSTEd installation was “How learning technology changes science education in the 2020+ era”.

The rapid spread of the coronavirus that causes COVID-19 has change conference organization. In Ukraine, the Ministry of Healthcare is advising people to prepared for disruptions to daily life that will be necessary if the coronavirus spreads within communities. On March 11, 2020, the Cabinet of Ministers of Ukraine introduced a nationwide quarantine in connection with a pandemic, and all public events in the country have been canceled. As the conference organizers, in the current crisis we had to make a rational decision regarding the paper presentations: a) cancel this year conference and put presentations online; b) postpone the conference to an indefinite time in the vague future; c) change dates to Fall 2021; d) merge conferences of this and next year; e) allow the mixed participation, both real and virtual.

It seems the last choice is safe and rational, so we decided not to change ICon-MaSTEd 2020 dates and give to participants the possibility to make a real presentation using ICT augmentation. Therefore, the XII International Conference on Mathematics, Science and Technology Education (ICon-MaSTEd



2020) took place 15–17 October, 2020 at the Kryvyi Rih State Pedagogical University, Ukraine. The format was hybrid, a mix of face-to-face and online participation.

There were 110 submissions selected. Each submission was reviewed by at least 4, and on the average 4.1, program committee members. The committee decided to accept 76 papers.

Due to quarantine restrictions, we offer the in-person talk option only to the local conference organizers and participants. Unfortunately, all conference participants from overseas should present their talks only online. Despite travel restrictions and health issues, more than 230 attendees from 10 countries are joined to ICon-MaSTEd 2020 using Google Meet. The conference featured plenary, invited and contributed talks in a wide number of subject areas: Mathematics Education, Biology Education, Chemistry Education, Physics Education, Astronomy Education, Earth Science Education, Computer Science and Computer Science Education, Integrated Science Education, Technology Education, and Educational Technology.

The presentation slots were defined as follows:

- plenary talks (30 min): 20 min presentation, 10 min question answering and discussion,
- other talks (20 min): 15 min presentation and 5 minutes question answering and discussion.

The full program with video record of talks is available at <https://easychair.org/smart-program/ICHTML2020/About.html> where details of the 2 plenary sessions and 24 parallel sessions, usually headed by one or more invited presentations.

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3. Proceedings overview

3.1. Mathematics Education

This section was presented by 9 talks:

- the article of Myroslav I. Zhaldak et al [75] discusses some use of cloud technology in mathematical calculations using Remote Desktop Ulteo OVD,
- Dmytro Y. Bobyliev et al in the article [6] analyzes experience of implementing the courses *Mathematical Analysis* and *History of Mathematics* for future Mathematics teachers in the system of managing electronic academic courses at Kryvyi Rih State Pedagogical University,
- István Lénárt in the article [29] discuss the educational project called Comparative Geometry,
- the article of Valerii I. Kuz'mich et al [25] deals with issues of the metric geometry basics,
- Anna Rybak in the article [51] describe the experience of Young Explorer's Club as the environment where students can discover knowledge by making experiments,
- the article of Marina G. Drushlyak et al [10] reveals the issue of the appropriateness of training pre-service mathematics teachers to use the techniques of mnemonics in professional activities,
- Kateryna V. Vlasenko et al in the article [71] looks into the issue of online-training of master students, majoring in Mathematics for internship in technical universities,
- article of Kateryna V. Vlasenko et al [70] considers the issue of developing motivational and value-orientated readiness of Math students at teacher training universities for implementing educational innovations,
- the article of Tetiana Kramarenko et al [23] considers the issue of developing motivational and value-orientated readiness of Math students at teacher training universities for implementing educational innovations.

3.2. Biology Education

This section was presented by 2 talks:

- the Elena V. Komarova's article [21] is dedicated to the problem of true and pseudoreplication of a biological experiment, in particular in the educational process,

- Vasyl Savosko et al in the article [52] show the experience of introducing into modern biological education methods of predictive modeling which are based on relevant factual material.

3.3. Chemistry Education

This section was presented by 2 talks:

- Tetiana M. Derkach in the article [9] analyse the typical mistakes in the learning of the university course of inorganic chemistry, determine the origin of misconceptions and estimate the effectiveness of the use of computer simulations to correct false chemical concepts,
- Liliia Midak et al in the article [35] shown the benefits of study chemical disciplines, applying the augmented reality for the upcoming chemistry teachers, as far as the visualisation of the demonstration material in the 3D helps students understand various processes and phenomena, the structure of chemical compounds and the mechanisms of their correlation in a better way.

3.4. Physics Education

This section was presented by 2 talks:

- the article of Oleksandr A. Konoval et al [22] deals with the theoretical analysis of the traditional approaches to electrodynamics teaching,
- Oleg I. Pursky et al in the article [49] presents a computational method for studying the thermal conductivity of molecular crystals that can be used in the educational course of condensed matter physics.

3.5. Astronomy Education

The method of astronomy homework organization in order to increase students' cognitive activity is described by of Svitlana Malchenko in the article [33].

3.6. Earth Science Education

This section was presented by 2 talks:

- the article of Ihor Kholoshyn et al [19] is devoted to the problem of incorporation geographic information systems (GIS) in world school practice,
- the article of Petro G. Pihulevskyi et al [44] provide the information on the number of earthquakes in Kryvyi Rih and their parameters for the period 2007–2018.

3.7. Computer Science and Computer Science Education

This section was presented by 19 talks:

- the article [11] presents the novel turmite-based cryptography algorithm has been designed and implemented by Liliia Fadieieva et al,
- the conceptual and mathematical models of the agents' knowledge potential redistribution considering their constituent components are constructed in the article [42] of Volodymyr V. Pasichnyk et al,
- the main idea of the article [74] authored by Pavlo V. Zahorodko is to identify the possibility of achieving, if not quantum supremacy, then at least a quantum advantage when solving machine learning problems on a quantum computer,
- the main aim of the article [31] authored by Nadiia Lobanchykova et al is the creation of information technology for mobile (of rapid deployment) security systems of the area perimeter,
- the article of Andrii Tkachuk et al [63] describes the gravity acceleration sensor (GAS) design, the technical characteristics of which provide an increase in the static transfer constant of the GAS, the ability to determine the current static transfer constant of the GAS, reducing the level of noise effects in the output signal of GAS,

- in the article of Igor Puleko et al [48] is described a software model that allows you to study the statistical characteristics of mobile networks,
- the article of Varvara Chernenko et al [8] deals with the development of a web application on forecasting the dynamics of prices in the residential sector of Ukraine,
- the use of augmented reality-enabled scenarios in cybersecurity teaching is proposed by Yuriy Skorenkyy et al in the article [58] to respond to new requirements for the rapid adoption of new technologies and profound knowledge of cybersecurity issues by professionals,
- the article [39] authored by Viacheslav V. Osadchyi et al reviews publications on the topic of augmented reality in STEM education, describes the concept of augmented reality, the analysis of augmented reality technologies is carried out, which are adapted to the teaching of natural and mathematical disciplines,
- the article of Dmytro S. Shepiliev et al [56] deals with applying augmented reality in the web environment to solving the task of development the career guidance quests,
- Iryna S. Zinovieva et al in the article [76] analyzes various publications of scientists on the training of future IT specialists and the features of training programming using online simulators,
- the article of Olena G. Glazunova et al [14] summarizes the results of a pedagogical study involving 29 expert students who study Computer Science and Software Engineering and used cloud service for GitHub collaborative IT development projects,
- the subject of the article [43] authored by Maksym Pavlenko et al is the formation of communication and teamwork skills of future IT-specialists, using project technology in teaching the administration of computer systems and networks,
- the article [4] reports Nadiia R. Balyk's et al experience of implementing educational projects in a computer modelling course offered to the students majoring in "Secondary Education (Computer Science)" at Ternopil Volodymyr Hnatiuk National Pedagogical University,
- the aim of the article [5] authored by Liudmyla Bilousova et al is to depict the functionality of the authors' mobile Android application "Petri Nets Tool-Kit", and to specify facilities and examples of its using for mastering modelling by students,
- the article of Vladyslav S. Kuznetsov et al [26] gives an overview of issues arising in connection with the organization and conduct of the course "Computer game development" in the master's program 014.09 Secondary education (Informatics),
- Yuriy V. Tryus et al in the article [67] substantiates the necessity and expediency of using the dual form of education in training specialists in the field of information technology in technical universities of Ukraine, interprets the concept of "dual education" from various sources, including UNESCO documents and the Law of Ukraine "On Education", analyzes some international experience of using dual study in higher education, in particular in Germany, considers the tasks to be solved for successful implementation of the dual form of higher education in Ukraine, and the main stages of this implementation for the period up to 2023,
- Nadiia S. Ponomareva in the article [47] emphasis that the teacher of mathematics should be capable for effective professional activity in a rapidly changing technology, educational paradigms and catastrophic educational disruptions, such as the current COVID-19 pandemic,
- the article of Serhiy O. Semerikov et al [53] is an attempt to rethink the concepts of "methodic" and "methodologic / methodical system" as basic to educational technology.

3.8. *Integrated Science Education*

This section was presented by 4 talks:

- the article of Pavlo P. Nechypurenko et al [38] analyzes the experience of implementing an integrated course "Science" in schools of Ukraine,

- the article of Leila Sultanova et al [60] considers the problem of the development of soft skills of teachers of Physics and Mathematics in higher educational institutions in the process of certification training in the system of postgraduate pedagogical education of Ukraine,
- the article of Svitlana Bodnar et al [7] highlights the problem of introducing integrated teaching the students majoring in economics in the educational process of Ukrainian tertiary non-linguistic schools,
- the article of Anna V. Iatsyshyn [17] considers factors that are influencing formation of scientists image especially: availability to inform scientist or scientific organization about the registration, scientometric indices, use of global identifiers to improve accuracy in calculating indicators, publication of papers in journals with high impact factor, publications in resources that provide visibility in global information space, involvement in global communications system, level of competence.

3.9. Technology Education

This section was presented by 5 talks:

- the purpose of article authored by George Abuselidze et al [1] is to investigate the impact of artificial intelligence on business education based on the experience of the world and particularly, in Georgia,
- the purpose of article [54] authored by Larysa M. Sergeieva et al is to substantiate the model of quality management of training of competitive specialists in professional (vocational technical) education taking into account the identified factors affecting the quality of training and contradictions that need to be resolved in the process of training and experimental verification of its effectiveness,
- the article of Valentyna Radkevych et al [50] discloses the peculiarities of developing professional competence in professional training teachers,
- the experience of application of methods of problem-based and project-based learning in the training of future engineers for the light industry is presented in the article [57] by Yana V. Shuhailo et al,
- the article of Viacheslav Holovnia et al [15] describes the analysis of computer-aided manufacturing systems introduction for the control program machines preparation with the numerical control into the technical students' educational process.

3.10. Educational Technology

This section was presented by 30 talks:

- the article of Natalya Yaremenko et al [73] deals with multimodal learning strategies aimed at transferring philological knowledge using ICT,
- the article of Oksana Babakina et al [2] is devoted to the urgent topic of using new modern information technologies in lessons in general and in the Ukrainian language lessons in particular,
- the article of Larysa Kupchyk et al [24] deals with the concept of student-centred Personal Learning Environment in the context of higher education, which is used as a means of transforming foreign language learning and teaching practices,
- Iryna Shavkun and other authors of article [55] search the solution to the practical tasks of the contemporary education characterized by the increasing role of individual work in implementation of ICT at the lessons and in the independent work, the development of new principles, strategies and methods of teaching within the framework of integrated learning,
- the article of Roman M. Horbatiuk et al [16] deals with the results of experimental work concerning the educational environment formation that is focused on the foreign language training of future energy engineering students,

- the article of Nataliia P. Volkova et al [72] addresses the issue of developing and using students' workshops in English,
- the article of Svitlana V. Symonenko et al [61] deals with the urgent issue of American English learning for IT-professionals under challenging conditions of the changeable economic situation in the world,
- to analyse what e-learning modes are used in a particular institution, to measure the efficiency of distance courses and, further, to suggest the most effective model and the ways of e-learning integration into a particular HEI according to its needs' analysis was set up as the aim of the article [64] authored by Anastasiia Tokarieva et al,
- the article of Liudmyla Bakhmat et al [3] aims at assessing the satisfaction and acceptance rate of Ukrainian lecturers with online education, as well as indicating problems and benefits they had singled out,
- the article of Tetiana Vakaliuk et al [68] substantiates the need to develop and implement a distance course "Cloud technologies in the educational process in quarantine",
- the relevance of the article [65] authored by Iryna M. Trubavina et al is explained by the necessity of developing digital competence of teachers of Humanitarian disciplines at the higher education institutions in the conditions of the quarantine measures to prevent the spread of COVID-19,
- the relevance of the Iryna M. Trubavina's et al article [66] relates to the need for continuing preschool education under quarantine conditions to prevent the spread of COVID-19 by means of distance technologies and preparation of children for STEAM-education,
- the article of Kateryna Polhun et al [46] highlights the urgency of the problem of introducing blended learning into the educational process of institutions of higher education and ensuring the quality of education using the tools of e-learning management system,
- the article of Nataliia P. Franchuk et al [13] considers the use of cloud technologies during distance learning,
- the article of Iryna K. Pokulyta et al [45] outlines both the potential of gamification and virtualization of media practices in the educational and further professional activities of a social worker, and points out the possible dangers of implementing these technologies for certain categories of people in need,
- in the article of Alla Lobanova et al [32] the actual modern problem that is pervasive minutes informatization of modern life, including the education system, which is not only positive but also negative effects on young people,
- Liudmyla V. Kalashnikova et al in the article [18] presents an overview of the main possibilities of using ICT in applied sociology, as well as the urgent need and importance of computer training of the students,
- the article of Liubov F. Panchenko et al [41] deals with the problem of PhD student training,
- the article of Mariia P. Leshchenko et al [30] devoted to the digital transformation of education and science which puts forward new requirements for training of graduate and doctoral students, in particular for development of informational and analytical competence,
- Arnold Kiv et al in the article [20] discusses the essence of lateral thinking and possible ways to test it,
- the article of Halyna M. Meshko et al [34] is devoted to the use of information technologies for pedagogical research aimed at studying the formation of key competencies and learning outcomes in higher education institutions, in particular, the professional responsibility of students of technical specialties,
- the article of Viacheslav V. Osadchyi et al [40] analyzes the possibilities of using innovative AR technologies in the process of developing the hardiness of the future specialist on the basis of the implementation of competence and subject-personal approach to the introduction of AR technologies in the educational process in the system of higher education,

- in article of Olena O. Lavrentieva et al [27] the definition of the educational institution information and consulting environment has been formulated,
- the article of Andrii V. Morozov et al [36] considers the expediency of developing and using the electronic environment of a higher education institution,
- Nataliia V. Morze et al in the article [37] highlights e-learning courses as the popular means of delivering knowledge to students in higher education institutions,
- the article of Vladyslav Ye. Velychko et al [69] looks into the effective use of open electronic educational resources,
- the article of Lidiia P. Tkachenko et al [62] touches upon the problem of introducing professionally oriented software products based on ICT into the educational process of training managers of the hotel, restaurant and tourism business,
- the novelty of the article [59] by Tetiana M. Sobchenko et al lies in determining and analyzing the levels of formation of innovative competency of students majoring in Philology,
- peculiarities of the usage of the hierarchy analysis method for the making decision on the choice of the most efficient computer mathematics system used for the preparation of the IT-sphere specialists are in the focus of the article [12] authored by Anatoliy Fedonuyk et al,
- the article of Evgeniy Lavrov et al [28] describes the problem of awakening the cognitive activity of students, arising due to revolutionary transformations in teaching technologies.

4. Conclusion

XII instalment of ICon-MaSTEd was organised by Kryvyi Rih State Pedagogical University, Ukraine (with support of the rector Prof. Yaroslav Shramko), in collaboration with Kryvyi Rih National University, Ukraine (with support of the rector Prof. Mykola Stupnik), Institute of Information Technologies and Learning Tools of the NAES of Ukraine (with support of the director Prof. Valeriy Bykov) and Ben-Gurion University of the Negev, Israel (with support of the rector Prof. Chaim Hames).

We are thankful to all the authors who submitted papers and the delegates for their participation and their interest in ICon-MaSTEd as a platform to share their ideas and innovation. Also, we are also thankful to all the program committee members for providing continuous guidance and efforts taken by peer reviewers contributed to improve the quality of papers provided constructive critical comments, improvements and corrections to the authors are gratefully appreciated for their contribution to the success of the conference. Moreover, we would like to thank the developers of EasyChair and HotCRP, who made it possible for us to use the resources of this excellent and comprehensive conference management system, from the call of papers and inviting reviewers, to handling paper submissions, communicating with the authors, and creating the volume of the conference proceedings.

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We are looking forward to excellent presentations and fruitful discussions, which will broaden our professional horizons. We hope all participants enjoy this conference and meet again in more friendly, hilarious, and happiness of further ICon-MaSTEd 2021. The next meeting in the series is the XII International Conference on Mathematics, Science and Technology Education, 12–14 May 2021, Kryvyi Rih, Ukraine (<https://icon-masted.easyscience.education/2021/>).

References

- [1] Abuselidze G and Mamaladze L 2021 The impact of artificial intelligence on employment

- before and during pandemic: A comparative analysis *Journal of Physics: Conference Series* In press
- [2] Babakina O O, Otroshko T V and Shcherbak I V 2021 Using interactive scribe-presentations when teaching Ukrainian *Journal of Physics: Conference Series* In press
- [3] Bakhmat L, Babakina O and Belmaz Ya 2021 Assessing online education during the COVID-19 pandemic: a survey of lecturers in Ukraine *Journal of Physics: Conference Series* In press
- [4] Balyk N, Grod I, Vasylenko Y, Oleksiuk V and Rogovchenko Yu 2021 Project-based learning in a computer modelling course *Journal of Physics: Conference Series* In press
- [5] Bilousova L, Gryzun L and Sivochka I 2021 Petri Nets Android application as a mobile aid for students' mastering modelling *Journal of Physics: Conference Series* In press
- [6] Bobyliev D Y and Vihrova E V 2021 Problems and prospects of distance learning in teaching fundamental subjects to future Mathematics teachers *Journal of Physics: Conference Series* In press
- [7] Bodnar S, Koval V, Deforz H, Babych O and Tereshchenko O 2021 Expanding opportunities for professional development through the use of integrated teaching *Journal of Physics: Conference Series* In press
- [8] Chernenko V, Pochtovyuk S, Vakaliuk T, Shevchuk L and Slon Y 2021 Information system of economic and mathematical modelling of pricing in the residential sector of Ukraine *Journal of Physics: Conference Series* In press
- [9] Derkach T M 2021 The origin of misconceptions in inorganic chemistry and their correction by computer modelling *Journal of Physics: Conference Series* In press
- [10] Drushlyak M G, Semenikhina O V, Proshkin V V and Sapozhnykov S V 2021 Training pre-service mathematics teacher to use mnemonic techniques *Journal of Physics: Conference Series* In press
- [11] Fadieieva L, Makarenko I and Merzlykin P 2021 The turmite-based cryptographic algorithm *Journal of Physics: Conference Series* In press
- [12] Fedonuyk A, Yunchyk V, Mukutuyk I, Duda O and Yatsyuk S 2021 Application of the hierarchy analysis method for the choice of the computer mathematics system for the IT-sphere specialists preparation *Journal of Physics: Conference Series* In press
- [13] Franchuk N P and Prydacha T V 2021 Organization and conduct of classes in educational institutions during distance learning *Journal of Physics: Conference Series* In press
- [14] Glazunova O G, Parhomenko O V, Korolchuk V I and Voloshyna T V 2021 The effectiveness of GitHub cloud services for implementing a programming training project: students' point of view *Journal of Physics: Conference Series* In press
- [15] Holovnia V, Horodyskyi M and Tkachuk A 2021 Students training for numerical control machines programming by means of computer-aided manufacturing tools *Journal of Physics: Conference Series* In press
- [16] Horbatiuk R M, Bilan N M, Sitkar O A and Tymoshchuk O S 2021 The formation of educational environment in foreign language training of energy engineering students by means of project technology *Journal of Physics: Conference Series* In press
- [17] Iatsyshyn Anna V, Popov O O, Kovach V O, Iatsyshyn Andrii V, Artemchuk V O, Radchenko O O, Deinega I I and Kovalenko V V 2021 Formation of the scientist image in modern conditions of digital society transformation *Journal of Physics: Conference Series* In press
- [18] Kalashnikova L V, Lobanova A S, Hrabovets I V, Chernous L S and Chorna V O 2021 Modern information and communication technologies in professional training of sociology students: the mainstreaming of the needs and significance *Journal of Physics: Conference Series* In press
- [19] Kholoshyn I, Nazarenko T, Bondarenko O, Hanchuk O and Varfolomyeyeva I 2021 The application of geographic information systems in schools around the world: a retrospective analysis *Journal of Physics: Conference Series* In press
- [20] Kiv A, Kolesnykova K, Koycheva T, Vinkovskaya A and Donchev I 2021 The development of

- creative thinking as an important task of educational process *Journal of Physics: Conference Series* In press
- [21] Komarova E V 2021 Replication, pseudoreplication and model experiment in the study of population genetics *Journal of Physics: Conference Series* In press
- [22] Konoval O, Turcot T and Solomenko A 2021 Contradictions in the traditional methods of electrodynamics teaching as a determinant of its update *Journal of Physics: Conference Series* In press
- [23] Kramarenko T, Bondar K and Shestopalova O 2021 The ICT usage in teaching mathematics to students with special educational needs *Journal of Physics: Conference Series* In press
- [24] Kupchyk L and Litvinchuk A 2021 Constructing personal learning environments through ICT-mediated foreign language instruction *Journal of Physics: Conference Series* In press
- [25] Kuz'mich V I and Kuzmich L V 2021 Elements of non-Euclidean geometry in the formation of the concept of rectilinear placement of points in schoolchildren *Journal of Physics: Conference Series* In press
- [26] Kuznetsov V S, Moiseienko M V, Moiseienko N V and Rostalny B A 2021 Using Unity to teach game development *Journal of Physics: Conference Series* In press
- [27] Lavrentieva O, Horbatiuk R, Skripnik L, Kuchma O, Penia V and Pahuta M 2021 Theoretical and methodological bases of designing the educational institution information and consulting environment *Journal of Physics: Conference Series* In press
- [28] Lavrov E, Logvinenko V, Siryk O and Kyzenko V 2021 Method for assessing the information content of factors forming the cognitive independence of students *Journal of Physics: Conference Series* In press
- [29] Lénárt I 2021 Comparative Geometry in distance education *Journal of Physics: Conference Series* In press
- [30] Leshchenko M P, Kolomiiets A M, Iatsyshyn A V, Kovalenko V V, Dakal A V and Radchenko O O 2021 Development of informational and research competence of postgraduate and doctoral students in conditions of digital transformation of science and education *Journal of Physics: Conference Series* In press
- [31] Lobanchykova N, Kredentsar S, Pilkevych I and Medvediev M 2021 Information technology for mobile perimeter security systems creation *Journal of Physics: Conference Series* In press
- [32] Lobanova A, Kuzior A, Zoska Ya, Viznytsia Yu, Kochmanska A and Komarova O 2021 The needs of intelligent information and media education for students of higher education institutes: the sociological aspect *Journal of Physics: Conference Series* In press
- [33] Malchenko S L 2021 Organization of astronomy homeworks with the use of informational and communicative technologies for cognitive activity increase *Journal of Physics: Conference Series* In press
- [34] Meshko H M, Habrusieva N V and Kryskov A A 2021 Research of professional responsibility of students of technical specialities by means of information and communication technologies *Journal of Physics: Conference Series* In press
- [35] Midak L, Kravets I, Kuzyshyn O, Baziuk L and Buzhdyhan K 2021 Specifics of using image visualization within education of the upcoming chemistry teachers with augmented reality technology *Journal of Physics: Conference Series* In press
- [36] Morozov A V and Vakaliuk T A 2021 An electronic environment of higher education institution (on the example of Zhytomyr Polytechnic State University) *Journal of Physics: Conference Series* In press
- [37] Morze N, Varchenko-Trotsenko L, Terletska T and Smyrnova-Trybulska E 2021 Implementation of adaptive learning at higher education institutions by means of Moodle LMS *Journal of Physics: Conference Series* In press
- [38] Nechypurenko P P, Selivanova T V and Fedorynova N Ye 2021 Analysis of some aspects of the implementation of the integrated course "Science" in the educational process of schools in

- Ukraine *Journal of Physics: Conference Series* In press
- [39] Osadchyi V V, Valko N V and Kuzmich L V 2021 Using augmented reality technologies for STEM education organization *Journal of Physics: Conference Series* In press
- [40] Osadchyi V, Varina H, Falko N, Osadcha K and Katkova T 2021 The peculiarities of the usage of AR technologies in the process of hardiness of future professionals *Journal of Physics: Conference Series* In press
- [41] Panchenko L F, Korzhov H O, Kolomiiets T V and Yenin M N 2021 PhD student training: principles and implementation *Journal of Physics: Conference Series* In press
- [42] Pasichnyk V V, Bomba A Y, Nazaruk M V and Kunanets N E 2021 The dynamics simulation of knowledge potentials of agents including the feedback *Journal of Physics: Conference Series* In press
- [43] Pavlenko M and Pavlenko L 2021 Formation of communication and teamwork skills of future IT-specialists using project technology *Journal of Physics: Conference Series* In press
- [44] Pihulevskiy P G, Anisimova L B, Kalinichenko O O, Panteleeva N B and Hanchuk O V 2021 Analysis of natural and technogenic factors on the seismicity of Kryvyi Rih *Journal of Physics: Conference Series* In press
- [45] Pokulyta I K and Kolotylo M O 2021 Media technologies and virtual practices in creative approaches to educational training of a social worker *Journal of Physics: Conference Series* In press
- [46] Polhun K, Kramarenko T, Maloivan M and Tomilina A 2021 Shift from blended learning to distance one during the lockdown period using Moodle: test control of students' academic achievement and analysis of its results *Journal of Physics: Conference Series* In press
- [47] Ponomareva N S 2021 Role and place of Informatics in the training of future teachers of mathematics *Journal of Physics: Conference Series* In press
- [48] Puleko I, Svintsytska O, Vlasenko O and Chumakevych V 2021 Software model for studying the features of wireless connections in Flying Ad-Hoc Networks (FANETs) *Journal of Physics: Conference Series* In press
- [49] Pursky O I, Dubovyk T V, Babenko V O, Gamaliy V F, Rasulov R A and Romanenko R P 2021 Computational method for studying the thermal conductivity of molecular crystals in the course of condensed matter physics *Journal of Physics: Conference Series* In press
- [50] Radkevych V, Kravets S, Herliand T, Radkevych O and Kozak A 2021 Modern technologies in the development of professional competence in teachers from professional (vocational) education schools *Journal of Physics: Conference Series* In press
- [51] Rybak A 2021 Learning by experimenting as a good way to effective and student friendly mathematics education – experiences from Young Explorer's Club *Journal of Physics: Conference Series* In press
- [52] Savosko V, Komarova I, Lykholat Yu, Yevtushenko E and Lykholat T 2021 Predictive model of heavy metals inputs to soil at Kryvyi Rih District and its use in the training for specialists in the field of Biology *Journal of Physics: Conference Series* In press
- [53] Semerikov S O, Teplytskyi I O, Soloviev V N, Hamaniuk V A, Ponomareva N S, Kolgatin O H, Kolgatina L S, Byelyavtseva T V, Amelina S M and Tarasenko R O 2021 Methodic quest: Reinventing the system *Journal of Physics: Conference Series* In press
- [54] Sergeieva L M and Stoychik T I 2021 Quality control modelling of competitive professionals' training at vocational education institutions *Journal of Physics: Conference Series* In press
- [55] Shavkun I H, Dybchynska Y S, Yudina O V, Bukharina L M, Shmygol N M and Shmygol Ye I 2021 Exploring the experience of integrated teaching of the management core courses in a foreign language based on ICT use *Journal of Physics: Conference Series* In press
- [56] Shepiliev D S, Semerikov S O, Yechkalo Yu V, Tkachuk V V, Markova O M, Modlo Ye O, Mintii I S, Mintii M M, Selivanova T V, Maksyshko N K, Vakaliuk T A, Osadchyi V V, Tarasenko R O, Amelina S M and Kiv A E 2021 Development of career guidance quests using WebAR *Journal of Physics: Conference Series* In press

- [57] Shuhailo Ya V and Derkach T M 2021 Project-based learning for undergraduate engineering students minoring in textile technology and design *Journal of Physics: Conference Series* In press
- [58] Skorenkyy Yu, Kozak R, Zagorodna N, Kramar O and Baran I 2021 Use of augmented reality-enabled prototyping of cyber-physical systems for improving cyber-security education *Journal of Physics: Conference Series* In press
- [59] Sobchenko T M, Bashkir O I, Smolianiuk N M and Panchenko V V 2021 Analyzing the levels of formation of future teachers' innovative competency in Ukraine *Journal of Physics: Conference Series* In press
- [60] Sultanova L, Hordiienko V, Romanova G and Tsytsiura K 2021 Development of soft skills of teachers of Physics and Mathematics *Journal of Physics: Conference Series* In press
- [61] Symonenko S V, Zaitseva N V, Vynogradova M S, Osadchyi V V and Sushchenko A V 2021 Application of ICT tools in teaching American English for computer science students in the context of global challenges *Journal of Physics: Conference Series* In press
- [62] Tkachenko L P, Dolgopol O O, Zhiglo O O, Kiryanova O V and Ivanova O A 2021 Implementation of professionally oriented ICT in the process of managers training *Journal of Physics: Conference Series* In press
- [63] Tkachuk A, Bezvesilna O, Dobrzhansky O and Ostapchuk A 2021 Single-rotor integrating gyroscopic gravimeter *Journal of Physics: Conference Series* In press
- [64] Tokarieva A V, Volkova N P, Degtyarivova Y V and Bobyr O I 2021 E-learning in the present-day context: from the experience of foreign languages department, PSACEA *Journal of Physics: Conference Series* In press
- [65] Trubavina I, Dotsenko S, Naboka O, Chaikovskyy M and Meshko H 2021 Developing digital competence of teachers of Humanitarian disciplines in the conditions of COVID-19 quarantine measures *Journal of Physics: Conference Series* In press
- [66] Trubavina I, Vorozhbit-Gorbatyuk V, Shtefan M, Kalina K and Dzhus O 2021 From the experience of organizing artistic and productive activities of older preschool children by means of distance education in the conditions of quarantine measures for the spread of COVID-19 *Journal of Physics: Conference Series* In press
- [67] Tryus Y V and Herasymenko I V 2021 Approaches, models, methods and means of training of future IT-specialists with the use of elements of dual education *Journal of Physics: Conference Series* In press
- [68] Vakaliuk T A, Spirin O M, Lobanchykova N M, Martseva L A, Novitska I V and Kontsedailo V V 2021 Features of distance learning of cloud technologies for the organization educational process in quarantine *Journal of Physics: Conference Series* In press
- [69] Velychko V Ye, Omelchenko S O, Khyzhniak I A and Fedorenko E G 2021 Developing and using open electronic educational resources in educational activities *Journal of Physics: Conference Series* In press
- [70] Vlasenko K V, Chumak O O, Sitak I V, Achkan V V and Kondratyeva O M 2021 Methods for developing motivational and value-orientated readiness of math students at teacher training universities for implementing educational innovations *Journal of Physics: Conference Series* In press
- [71] Vlasenko K V, Lovianova I V, Chumak O O, Sitak I V and Achkan V V 2021 The arrangement of on-line training of master students, majoring in Mathematics for internship in technical universities *Journal of Physics: Conference Series* In press
- [72] Volkova N P, Tarnopolsky O B, Lebid O V, Kabanova M R and Vlasenko K V 2021 Students' computer-based workshops in mandatory classes of English for students majoring in psychology and linguistics: A comparative experimental study *Journal of Physics: Conference Series* In press
- [73] Yaremenko N, Kolomiets N, Kharadzjan N, Mishenina T and Kohut I 2021 Multimodality of philological knowledge passing during the in-class activities using ICT *Journal of Physics:*

Conference Series In press

- [74] Zahorodko P V, Semerikov S O, Soloviev V N, Striuk A M, Striuk M I and Shalatska H M 2021 Comparisons of performance between quantum-enhanced and classical machine learning algorithms on the IBM Quantum Experience *Journal of Physics: Conference Series In press*
- [75] Zhaldak M I, Franchuk V M and Franchuk N P 2021 Some applications of cloud technologies in mathematical calculations *Journal of Physics: Conference Series In press*
- [76] Zinovieva I S, Artemchuk V O, Iatsyshyn Anna V, Popov O O, Kovach V O, Iatsyshyn Andrii V, Romanenko Y O and Radchenko O V 2021 The use of online coding platforms as additional distance tools in programming education *Journal of Physics: Conference Series In press*