REPORT
of the work of the dissertation council

Dissertational council at Abai Kazakh National Pedagogical University on a group of specialties 6D011100-Informatics and 6D060200-Informatics

1. Data on the number of meetings held

4 meetings have been held in the dissertation council at the Abai Kazakh National Pedagogical University on the group of specialties 6D011100-Informatics and 6D060200-Informatics in the reporting year (01.01.2020-31.12.2020).

2. Full names of the dissertation council members, who attended less than half of the meetings

There are no dissertation council members, who attended less than half of the meetings.

3. List of doctoral students with an indication of the organization of training

- Mukhamediyeva Kymbatsha, L.N. Gumilyev Eurasian National University;
- Kydyralina Lazat, Shakarim University;
- Adranova Asselkhan, Korkyt Ata Kyzylorda University.

4. Brief analysis of dissertations reviewed by the council during the reporting year, highlighting the following sections:

On the dissertation of Mukhamediyeva Kymbatsha:

1) analysis of the themes of the reviewed works;

Dissertation theme – The Methodology of design and Robotics technologies educational implementations in the higher education establishment.

Specialty: 6D011100-Informatics

Scientific supervisors – Doc.Ped.Sci., Professor Nurbekova Zh.K.; PhD Alfredo Pina Calafi.

The defense was held on 10 January 2020.

New and reliable results have been received in the study:

– the content of educational Robotics teaching at pedagogical University has been determined;

– a functional model of educational technologies project-making in Robotics on the base of Methodology of pedagogical project-making with the usage of digital technologies has been developed;

– the tooling means have been made: the computer program for project-making of educational technologies, digital educational resources on Robotics, electronic diagnostic materials, and the system of robotics and technical educational tasks in the structure of digital eco-environment and implementation of educational technologies on Robotics at pedagogical University.

2) the connection between the topics of dissertations and the directions of development of science, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs;

The introduction of educational robotics into the school education system has determined the increasing role of STEM education. The country needs teachers who can effectively teach robotics at school. The course of educational robotics is being introduced into the educational programs of a pedagogical university. Improving the quality of teaching robotics requires the adaptation of educational technologies in the Kazakh system of higher education, as well as in the development of new educational technologies in robotics. Therefore, it is clear that in order to fully cover the technology of developing educational material in robotics, it becomes necessary to use educational technology as an object of pedagogical design to ensure the achievement of the learning outcome in robotics.

Designing educational technology in robotics requires a strict logical sequence with the inclusion of expert knowledge and solutions in this area, which can be realized using digital technologies.

The research focus of the dissertation is in line with the priority areas of the state educational policy: updating the content of general secondary education, developing the image of teachers capable of designing educational activities.

3) analysis of the level of implementation of the results of dissertations in practical activities

The content of educational robotics training in a pedagogical university for high-quality training of future teachers of informatics, a generalized methodological system of teaching robotics, a developed computer program for the design of educational technologies in robotics, digital educational resources in robotics with animated content and AR, electronic diagnostic materials, a built system of robotic educational tasks

The results obtained during the implementation of the dissertation research can be used by teachers in the preparation of future teachers of computer science in pedagogical universities.

On the dissertation of Kydyralina Lazat:

1) analysis of the themes of the reviewed works;

Dissertation theme – Methods and models of integrated protection of the educational information environment of the university.

Specialty: 6D060200-Informatics

Scientific supervisors – Doc.Tech.Sci., Professor Akhmetov B.S.; Doc.Tech.Sci., Professor Lakhno Valeriy

The defense was held on 28 December 2020.

New and reliable results have been received in the study:

- there were proposed new models for the computing core of an intellectualized DSS for choosing a rational financial strategy for investing in IPTM and CS of IEEU. The novelty of the models lies in the fact that they allow to find solutions for bilinear multi-step quality games with dependent movements and to determine the sets of preferences and rational strategies of the IEEU defender;

- there was proposed a model for automating the procedures for adjusting the user profile in order to minimize or neutralize cyber threats in IEEU, in comparison to the existing model, it is based on the mathematical apparatus of Petri nets and

takes into account variables that allow reducing the power of the state subspace, which increases the effectiveness of modeling due to reducing the time spent on decision making related to the regulation of user access rights to IEEU nodes;

- there was clarified and supplemented the method for controlling user access rights to IEEU nodes, in comparison to the existing ones, the additions imply the adjustment of security rules and metrics based on the application of the Petri nets notation for new or redistributed tasks;

- there was improved the method of multicriteria discrete optimization for solving problems of assessing the security of IEEU. In comparison to the existing ones, the proposed improved method is based on a combination of the Edgeworth-Pareto discrete optimization method and the lexicographic method, which made it possible to develop a vector criterion for assessing solutions, including two optimality conditions as components: the cost estimate of the considered IPTM variant and the assessment of its technical efficiency for a specific IEEU.

2) the connection between the topics of dissertations and the directions of development of science, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs;

The developed methods and models make it possible to find solutions for bilinear multi-step games of quality with dependent movements and to determine the sets of preferences and rational strategies of the ITS defender of the university. And in addition, the proposed models allow you to adjust user profiles in the ITS of the university to minimize or neutralize cyber threats, which allows you to increase the effectiveness of modeling by reducing the time spent on making decisions related to the regulation of user access rights to the nodes of the ITS of the university.

3) analysis of the level of implementation of the results of dissertations in practical activities

For implementation in practice are offered applied software products (SP) in the VisualStudio 2017 environment for solving problems of assessing the security of IEEU ("DSS DSS Module -Pareto Method for the Selection of Information Protection Means (IPM)"), which implements optimal choice algorithms for the design of IPM of IEEU) and the choice of a rational financial strategy for ensuring the cybersecurity of IEEU ("Choosing a rational financial strategy for ensuring cybersecurity of IEEU (DSS)"). Software implementations of the developed models in the "Pareto method for choosing IPM", "Choosing a rational financial strategy to ensure the cybersecurity of IEEU" allows to select the optimal financial strategy component of the protection side for any ratio of parameters describing the financing process, no matter how financially the second party tries to break the perimeters of IEEU protection.

On the dissertation of Adranova Asselkhan:

1) analysis of the themes of the reviewed works;

Dissertation theme – Models, methods and algorithms for information security of distance learning.

Specialty: 6D060200-Informatics

Scientific supervisors – Doc.Tech.Sci., Professor Akhmetov B.S.; Doc.Tech.Sci., Professor Lakhno Valeriy

The defense was held on 28 December 2020.

New and reliable results have been received in the study:

– there was obtained a model for describing the cyber threats of the DLS based on Markov chains, which allows creating specific Markov models of attacks on DEEU and DLS, and in conjunction with models and algorithms for choosing a rational strategy for investing of CS of the DLS, makes it possible to improve the methodology for creating a functionally stable and secure DLS;

– there was improved the method for identifying cyber threats in the DLS, which, in contrast to the existing ones, contains recursive algorithms for distributed network self-learning and the choice of countermeasures (strategies, in particular financial or technical for the DLS protection), depending on the type of cyber threats;

– there was improved a mathematical model for ensuring FS and CS of VCR for software-configurable networks of DLS, which, unlike the existing ones, takes into account the state of VCR and the choice of possible countermeasures based on a complex indicator for software- configurable networks, as well as through the procedure for applying attack graphs on VCS, which allows to receive information about all known vulnerabilities of the system, and also shows the state of the FS and CS of VCR in real time;

– there was further developed the methodology for choosing the optimal variant for creating a system of IP and CS of the DLS, which, in contrast to the existing ones, was supplemented with an improved method for identifying cyber threats in InN and DLS, with a model of an information security control system of the DLS as a queuing system and with an antagonistic game model for finding effective and efficient IPS in conditions of a limited budget of the educational institution.

2) the connection between the topics of dissertations and the directions of development of science, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs:

Development of the model and methods of protection of distance learning systems (LMS) in the face of increasing complexity of destructive interference in their work by computer intruders. At the same time, for the first time, a model was obtained for describing the cyber threats to LMS based on Markov chains, which allows building specific Markov models of threats to attacks on LMS. The method for detecting cyber threats in the LMS has also been improved, which, unlike the existing ones, contains recursive algorithms for distributed network self-learning and a model for ensuring the functional stability and cybersecurity of the virtual cloud environment for software-defined LMS networks, which, unlike the existing ones, takes into account the state of the university's cloud environment and allows for a selection of possible countermeasures based on a comprehensive metric for SDN.

3) analysis of the level of implementation of the results of dissertations in practical activities

Development of applied software products in the Rad Studio 10.3 environment. The developed software programs ensure greater efficiency of the creating of ISCS of the DLS and increase the reliability of the results of interpreting the level of acceptable risk for the DLS. The computational experiments carried out on the basis of the developed software products confirmed the reliability of the main theoretical provisions of the dissertation work. It has been shown experimentally that the proposed solutions make it possible to increase the FS and CS of VCS, and the DLS in general by 12–17% in comparison with the known solutions. The proposed methods, models and developed software programs can be used to increase the degree of cyber security of the DLS of universities.

5. Analysis of the work of official reviewers (with examples of the most low-quality reviews)

Scientists who contributed in the fields of informatics and informatization of education were approved by the reviewers. The reviewers have expertly analyzed doctoral dissertations.

Information about the dissertation reviewers of Mukhamediyeva K.M.:

Sadvakasova Raisa - Doctor of pedagogical sciences, Director of the branch JSC NCCE «Orleu» Institute of Continuing Education of teachers in the city of Almaty.

Medetov Bekbolat - PhD, Senior Lecturer of Solid State Physics and Nonlinear Physics department of al-Farabi Kazakh National University.

Information about the dissertation reviewers of Kydyralina L.M.:

Utepbergenov Irbulat Turemuratovich - Doctor of Technical Sciences, Professor, Chief Researcher of the Institute of Information and Computing Technologies of the Ministry of Education and Science of the Republic of Kazakhstan.

Kozbakova Ainur Kholdasovna - Phd, Associate Professor, Head of the Department IT-engineering of the Almaty University of Power Engineering and Telecommunications named after G. Daukeev.

Information about the dissertation reviewers of Adranova A.B.:

Tukeyev Ualsher - Doctor of Technical Sciences, Professor Kazakh National University named after Al-Farabi.

Kalizhanova Aliya - Candidate of physical and mathematical sciences, Associate Professor of Almaty University of Power Engineering and Telecommunications named Gumarbek Daukeyev.

6. Proposals for the further improvement of the system of training scientific personnel

There are the following suggestions for improving the activity of dissertation councils:

- universities and graduating departments that send dissertations for defense should pay special attention to the quality of research work and the documents required for defense;
- develop regulatory requirements for writing and completing a PhD thesis;

7. The number of dissertations for the degrees of Doctor of Philosophy (PhD), Doctor by profile in the context of specialties (areas of training):

	6D011100-Informatics	6D060200-Informatics
Dissertation accepted for defense	1	2
Dissertations accepted for defense (including doctoral students from other universities);	1	-
Rejected dissertations (including doctoral students from other universities)	-	-
Dissertations for which negative reviews were received from reviewers (including doctoral students from other universities)	-	-
Dissertations with a negative decision based on the results of defense (including doctoral students from other universities).	-	-

Chairman of the Dissertational Council _____ (sign, full name) Bidaibekov Ye.Y.

Scientific Secretary of the Dissertation Council _____ (sign, full name) Sagimbayeva A.Ye.

"14" January 2021