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## STRATEGIES FOR THE DEVELOPMENT OF HIGHER EDUCATION IN THE KYRGYZ REPUBLIC: DIGITALIZATION AND INTEGRATION OF SCIENCE AND EDUCATION

### ESTRATEGIAS PARA EL DESARROLLO DE LA EDUCACIÓN SUPERIOR EN LA REPÚBLICA DE KIRGUIZ: DIGITALIZACIÓN E INTEGRACIÓN DE LA CIENCIA Y LA EDUCACIÓN

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#### ABSTRACT

The purpose of the study is to identify the main trends and problems in the development of higher education in the Kyrgyz Republic and to propose potential solutions. The methods employed include a review of relevant literature and an analysis of existing policies and initiatives. The results of the study indicate that Kyrgyzstan has made efforts to embrace digitalization in education, such as providing free Internet access to students and teachers, developing electronic teaching materials, and implementing distance learning during the COVID-19 pandemic. These measures have led to an increase in the use of information technology at all levels of education, including higher education. However, challenges related to funding, the quality of educational services, and the shortage of qualified personnel persist. The article concludes by emphasizing the need for further investment in digital infrastructure, teacher training, and research collaboration to ensure the effective development of higher education in Kyrgyzstan.

#### Keywords:

Higher Education, Kyrgyz Republic, digitalization, science-education integration, distance learning.

#### RESUMEN

El propósito del estudio es identificar las principales tendencias y problemas en el desarrollo de la educación superior en la República Kirguisa y proponer posibles soluciones. Los métodos empleados incluyen una revisión de la literatura relevante y un análisis de las políticas e iniciativas existentes. Los resultados del estudio indican que Kirguistán se ha esforzado por adoptar la digitalización en la educación, como proporcionar acceso gratuito a Internet a estudiantes y profesores, desarrollar materiales didácticos electrónicos e implementar el aprendizaje a distancia durante la pandemia de COVID-19. Estas medidas han llevado a un aumento en el uso de la tecnología de la información en todos los niveles de la educación, incluida la educación superior. Sin embargo, persisten desafíos relacionados con el financiamiento, la calidad de los servicios educativos y la escasez de personal calificado. El artículo concluye enfatizando la necesidad de una mayor inversión en infraestructura digital, capacitación de docentes y colaboración en investigación para garantizar el desarrollo efectivo de la educación superior en Kirguistán.

#### Palabras clave:

Educación superior, República Kirguisa, digitalización, integración ciencia-educación, aprendizaje a distancia.

## INTRODUCTION

The development of higher education plays an important role in shaping the future of any country. In the Kyrgyz Republic, higher education is facing various challenges that require careful attention and strategic interventions. In particular, the digitalization of education and the integration of science and education have emerged as key areas demanding focused efforts. Embracing digital technologies and fostering collaboration between academia and scientific institutions are essential for advancing the quality and effectiveness of higher education in Kyrgyzstan.

Digitalization has become an imperative for educational institutions worldwide, offering new possibilities for teaching, learning, and research. Kyrgyzstan recognized the significance of digitalization early on, with universities providing students and teachers free access to the Internet since the early 2000s. Moreover, the country has implemented policies and initiatives aimed at developing electronic teaching materials and leveraging digital platforms.

Further directions for digitalization in the country are associated with the Digital Kyrgyzstan 2019-2023 concept (Security Council of the Kyrgyz Republic, 2018) developed based on the National Strategy for Sustainable Development of the Kyrgyz Republic 2018-2040. The concept defines the structure, management system, and foundations of the country's digitalization process.

Kyrgyzstan has also adopted the Education Development Program of the Kyrgyz Republic for 2021-2040, where the third clause outlines the development of technology, i.e., digitalization. The tasks established in the document include:

- Development of IT education and training of highly qualified IT specialists;
- Digital skills for the entire population, including vulnerable groups;
- Development of national digital content in the state language.

The interest of the new generation in digitalization is rapidly growing. The number of personal websites has increased 2.7 times in the last three years compared to 2018. The largest part (97.1%) of websites functioned in Bishkek, and during the pandemic, the trend intensified in other regions of the country.

As noted by Raimkulova (2022), *“the prioritization of the information type of society allows us to determine the possibilities of distance, virtual learning:*

*a) formation and expansion of the intellectual and cognitive development of the future generation;*

*b) successful provision of conditions for self-realization and self-determination of the individual;*

*c) combination of education with work activity and drastic improvement of the quality of education;*

*d) ensuring equal opportunities for education and professional development regardless of age and place of residence;*

*e) ensuring a real opportunity to quickly obtain up-to-date knowledge and have access to information sources of any importance, etc.”*

The COVID-19 pandemic resulted in increased use of IT at all levels of education, including higher education: from April 8, 2020, all universities switched to distance learning. Higher education institutions began to post the content of the taught disciplines (teaching materials, texts of lectures, assignments of students' independent work) for all courses, as well as assignments for interim and final examinations, on digital platforms.

For example, Development Strategy of the Kyrgyz State University named after I. Arabaev until 2025 (2020), notes that the university “has a unified information network, information technologies are implemented in the educational process, library support of the educational process meets modern requirements. There are six buildings of the university united into a single corporate network. The total number of computers is about 1,000... Their ratio to the total number of students is one computer per nine students. Special attention is paid to the introduction of educational information technologies, including the use of multimedia training programs and information resources available on the Internet, the creation of electronic textbooks, and the development of corporate networks.

(The Information Technology Department) is working on the adaptation and debugging of several software products, 300 electronic educational and methodological complexes of disciplines (EEMCDs) have been developed, and it is planned to develop another 100 EEMCDs. The website of the Kyrgyz State University named after I. Arabaev has been registered and is operating on the Internet. The website also serves as an educational portal, since it has a link to the website with a catalog of distance learning services <http://www.avn.kg>. This is the site for holding interim examinations for part-time students studying via distance learning technologies.

The Information Technology Department actively uses web technologies for information support; teaching and methodological complexes for disciplines are available on the website of distance education for access from any part of the world; remote exchange of information

with extramural students is established. In the future, it is planned to develop an integrated software and hardware complex allowing to collect, process, store, transfer, and conduct primary systematization and analysis of data on the educational process”.

In 2020, in cooperation with the High Technology Park, universities held an online marathon (a series of webinars) “EdTech: A New Educational Reality”. The task of the webinars was to provide information about the introduction of new educational technologies, raise awareness of graduates about employment in major IT companies in the country, and inform them about IT programs at universities and short-term courses.

Furthermore, in 2020, all universities connected to the Tunduk interdepartmental electronic interaction system, which includes databases of issued diplomas, issued certificates, attestation documents, and licenses (Dyushembaev et al., 2016).

Also, since 2020, all applicants apply to universities through an online system, submitting documents electronically and tracking their admission online. The Information System for the enrollment of Kyrgyz citizens in foreign universities through the Ministry of Education and Science of the Kyrgyz Republic was created.

As pointed out by Raimkulova (2022), the analysis of the digitalization of education in Kyrgyzstan shows that 65% of respondents who took part in the online survey of university teachers reported having insufficient knowledge about digital technologies. Most teachers have difficulties working with digital technologies, are not capable of diverse and effective work online, are psychologically unprepared for developing their digital literacy, and are not ready to balance traditional and electronic learning.

Therefore, in response to the challenges of digitalization, it is necessary to pay attention to creating a pool of teaching staff capable of working in a digital environment and utilizing blended learning methods (online/offline), as well as technologies for developing digital educational content, methods for assessing its quality and its application in the educational process, etc. **“At the same time, a teacher should know that a digital university has to provide each student with the opportunity to determine their own educational route and the time, pace, and order of its completion, ensure freedom of choice of educational content, and offer a computer-based learning environment and tutoring support”.** (Raimkulova, 2022)

For several years, “ has been pursuing a policy of integration of science and education to ensure the involvement

of students and teachers in the development of scientific research, including for projects of economic importance to the state.

The main problems facing university science include:

- weakening of ties between scientific organizations, educational organizations, and production enterprises;
- insufficient volumes and imperfect mechanisms of funding for research in universities and insufficient participation of business in it;
- low level of development of material and technical and scientific base of higher education institutions;
- shortage of research staff and their insufficient expertise in higher education institutions and research institutes;
- imperfect regulatory and legal framework for innovation activities;
- low level of commercialization of research and development in university research.

Therefore, to examine the challenges and opportunities related to the digitalization of education and the integration of science and education in the higher education system of Kyrgyzstan.

## MATERIALS AND METHODS

This study employs a mixed-methods approach to examine the challenges of digitalization and the integration of science and education in the higher education system of Kyrgyzstan. The research methodology involves a review of relevant literature and an analysis of existing initiatives.

The literature review encompasses scholarly articles, reports, government documents, and educational policy frameworks. It provides a theoretical foundation by exploring the key concepts and theories related to digitalization in education, science-education integration, and higher education development.

To complement the literature review, an analysis of existing policies and initiatives in Kyrgyzstan is conducted. This involves an examination of documents such as the Digital Kyrgyzstan 2019-2023 concept, the Program for the Development of Education in the Kyrgyz Republic for 2021-2040, and the Concept for the Development of Science in the Kyrgyz Republic for the period 2022-2030. These policy documents provide insights into the goals, strategies, and approaches employed by the government and educational institutions to promote digitalization and science-education integration in the higher education sector.

## RESULTS AND DISCUSSION

From the research findings, we conclude that in order to solve the problems faced by the higher education system, Kyrgyzstan has implemented several measures to support the integration of science and education, increase research potential, and stimulate innovations. The adoption of the Law on Science and the Foundations of State Scientific and Technical Policy in 2017 along with the development of the Concept for the Development of Science in the Kyrgyz Republic for 2022-2030 has laid the foundation for the promotion of scientific research and development (Kyrgyz Republic. Supreme Council, 2017a).

The Law of the Kyrgyz Republic 110. (Kyrgyz Republic. Supreme Council, 2017b) "On the National Academy of Sciences of the Kyrgyz Republic" was amended to clarify the purposes, tasks, and functions of the National Academy of Sciences in modern conditions, and the new Statute of the National Academy of Sciences of the Kyrgyz Republic was approved (Kyrgyz Republic. Supreme Council, 2017c). The Concept for the Development of Science in the Kyrgyz Republic for the period 2022-2030 has also been proposed.

One of the noticeable results of these efforts is increased funding for science. The share of GDP invested in science has grown from 0.04% in 2013 to 0.1% in 2017-2021.

In 2021, the Republican budget provided 219 research projects with a total of 158 mln UZS, including 30 projects in humanities, 24 in natural sciences, 56 in medical science, 66 in agriculture, and 43 in technology.

In 2022, 146 million 352 UZS were allocated as part of the state order, with priority given to agricultural, medical, and technical sciences.

Since 2012, applications for funding for scientific topics have been submitted on a competitive basis, with the selection being ever more rigorous to ensure that the funds are channeled to topics that are truly important for the development of the economy, society, or science itself.

Nevertheless, there is a persisting problem with the quality of submitted applications and the number of research topics. For this reason, in 2022, for the purpose of decentralizing research work, regional universities in Kyrgyzstan were ordered to relate their scientific work to the environmental, infrastructural, and anthropogenic characteristics of a particular region.

To consolidate research potential and increase responsibility for scientific results in the country's universities, the state has established seven scientific research centers. Among these are the Institute for Seismic Resistant Construction

of the Kyrgyz State University of Construction and Architecture, the Research Center for Medical Problems under the Kyrgyz State University of Construction and Architecture, the Institute for Fundamental and Applied Research of the Osh State University, the Research Center for Issyk-Kul Problems under the Issyk-Kul State University, the Innovative Technology Institute of the Kyrgyz-Uzbek University, and the Institute for Regional Problems of the Jalal-Abad State University. Memoranda on integration have also been signed by six universities and 17 research institutes to facilitate cooperation and knowledge-sharing.

In 2020, a mechanism for the integration of research institutes and universities was developed. Education-science-production complexes started to be developed based on universities. In 2021, business incubators and startups began operating in state universities, and several technoparks have been working.

The recognition of the state's importance in preserving and developing technoparks as an efficient way of organizing research and development work and a tool for implementing the strategy for stimulating economic growth is one of the key points in the transition to the innovation economy.

There has emerged a need to establish a comprehensive mechanism of state support for technoparks and to develop mechanisms to support technoparks in the market economy.

To this end, the Law of the Kyrgyz Republic 84 (Kyrgyz Republic. Supreme Council, 2011) "On the High-Tech Park of the Kyrgyz Republic" was adopted, the purpose of which is to establish the basic legal, economic, and social conditions and guarantees to ensure the creation and operation of the technopark in Kyrgyzstan.

The goals behind creating the technopark are:

- to realize state policy on the national innovation system;
- to stimulate the socio-economic development of Kyrgyzstan by promoting innovative activities;
- to commercialize innovative developments and projects in demand in the domestic market and abroad;
- to integrate innovative businesses and research organizations;
- to create conditions for the efficient exchange of knowledge and technology between educational organizations, research and project institutes, and production enterprises;
- to ensure conditions for the development of innovative production and enterprises that attract private and

foreign capital to the creation of knowledge-intensive products, bringing them to the market.

The creation of new staff with 4-K competencies, including competencies aimed at developing creative solutions, should serve to change the status of the country's five universities. These universities were given special status as innovative research centers (i.e., the Kyrgyz National University, the Kyrgyz State Polytechnic University, the Kyrgyz National Agrarian University, the Kyrgyz State Medical Academy, and the Osh State University).

This step has also launched the implementation of the University 4.0 Roadmap. A 4.0 university will be obligated to create commercialized intellectual property, actively develop new technologies and create technological companies, and serve as a center of new technological industries.

Order of the Ministry of Education and Science of the Kyrgyz Republic № 1400/1 dated October 24, 2016, has defined the priority areas for the development of science:

1. Rational use of natural resources;
2. Food security;
3. IT;
4. Human health and quality of life;
5. New technologies in the energy sector;
6. Development of tourism and transportation system;
7. Social sciences and humanities.

Over the past 2 years, this work has accomplished the following:

1. research and development work has started to shift from quantitative to qualitative development;
2. the performance of research and development works has moved to targeted execution, namely in the interests of the sectoral state body;
3. acceptance and evaluation of research and development works were introduced in the digital format with the observation of confidentiality;
4. the competition of experts is held openly.

## CONCLUSIONS

The development of the higher education system of Kyrgyzstan clearly has certain features and requires constant monitoring to discover its key trends and promptly respond to those that can have negative consequences. Admittedly, the Kyrgyz higher education system is still in the stage of development and formation, so it is difficult to utilize it as an effective tool of economic policy as of now.

Insufficient interaction and efficiency of educational organizations combined with the inability of schools and universities to perform their duties undermine public and state confidence in education. The presence of profit-oriented private educational institutions only further exacerbates concerns about the quality and effectiveness of education.

Statistical indicators of the higher education system of Kyrgyzstan show negative trends in the development of educational organizations. Solving the problems facing the higher education system in Kyrgyzstan requires a comprehensive approach that includes adequate funding, legislative reforms, professional development of teachers, and integration of technologies. Through these measures, Kyrgyzstan can improve the quality and efficiency of its higher education system, promote innovation and research, and pave the way for socio-economic growth and development.

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