

Implementation of the Unified Information System of Education in Higher Education - Significance and Effects

M. Lazić*, M. Kovačević*, N. Tasić**, M. Pardanjac**

* Technical College of Applied Science in Zrenjanin, Zrenjanin, Republic of Serbia

**University of Novi Sad, Technical faculty „Mihajlo Pupin“ in Zrenjanin

matildalazic@outlook.com, miodrag.kovacevic.zr@gmail.com, ntasic89@gmail.com

Abstract - The paper discusses the expected effects and the importance of implementation of the Unified Information System of Education-UISE to higher education. It is assumed that UISE is established and regulated by the Law on the Fundamentals of the Education System in the education system, which will encompass pre-university education and higher education. It is also assumed that UISE represents one of the most important instruments for achieving higher education reforms, which would lead to its modernization and internationalization. The main effect of introducing of UISE is that the State gets a picture of the entire education system in one place. Other expected effects may include: development of usable records for the state, e.g. statistical data related to students and study programs, data on institutions and employees; on the basis of which the analysis of resources, success of the higher education system and projections of investments in it can be performed. Raising the IT capacity of higher education contributes to the development of e-government in the Republic of Serbia. The introduction of UISE significantly contributes to the reforms of higher education, especially in the segment of perceiving its advantages and disadvantages, but also in the field of opening up to the environment and moving towards EU integration.

I. INTRODUCTION

In accordance with the context, directions and goals of the current Strategy for the Development of Education in the Republic of Serbia until 2020-SDES [1], mechanisms have been developed that will enable higher education: to become a competent part of the European education area (according to documents: Agenda 2030 in Serbia [2], Strategy of Scientific and Technological Development of the Republic of Serbia [3], Challenges in Higher Education [4]); to become attractive for international cooperation and provision of educational services in the immediate vicinity of the Republic of Serbia and in the Western Balkans [1]; to improve its work and use its own resources more rationally towards achieving goals in the future. In order to implement the SDES and enable the State to act in the entire education system, a set of amendments has been made to the Law on the Fundamentals of the Education System [5] and the

Law on Higher Education [6,7]. Relevant bylaws have also been implemented.

This paper discusses the importance and expected effects of implementation of UISE on the development of higher education. It is assumed that in the education system only one law, i.e. the Law on the Fundamentals of the Education System [5], establishes and regulates UISE, which will cover pre-university education and higher education. Accordingly, the Law on Higher Education [7] represents the so-called related regulation. It is also assumed that UISE represents one of the most important instruments for achieving higher education reforms, which would lead to its modernization and internationalization.

II. LEGAL BASIS FOR THE INTRODUCTION OF UISE

The original legal basis for the introduction and functioning of UISE in higher education is the Law on the Fundamentals of the Education System [5]. It regulates the matter of UISE at all levels of education, which makes it important to be applied in practice. Bylaws regulate in more detail the mechanism of functioning of UISE; manner and procedure of introducing it and the use of the Personal Educational Number-PEN for the needs of UISE; key leaders and executors, monitoring and reporting instruments within the UISE.

It must be emphasized that the provisions of the Law on the Fundamentals of the Education System [5] related to UISE, are harmonized with the Law on Personal Data Protection, which is a very important fact in the electronic society to which the Republic of Serbia aspires.

A. *The role of the Law on the Fundamentals of the Education System*

The provisions of Articles 175 and 176 of the Law on the Fundamentals of the Education System [5] regulate the implementation of UISE and PEN.

UISE is a set of databases and computer programs, necessary for the collection and processing of data in records and registers, while ensuring the protection of personal data. The higher education institution, i.e. the institution of student standard keeps records on children, adults and students covered by formal education, on students' parents as well as on employees [5].

The Ministry of Education, Science and Technological Development-Ministry, within the UISE keeps the following registers [5] relevant to higher education:

- ✓ accredited higher education institutions;
- ✓ accredited study programs;
- ✓ students;
- ✓ employees in higher education institutions.

Data from the records kept by the higher education institution are entered and updated in the mentioned registers [5]. The Government Service is a data processor in accordance with the regulations governing e-government and information security.

For the needs of keeping the mentioned registers [5] and protection of personal data, the PEN is formed, which follows its holder through all levels of formal education (and through non-formal education). The PEN is the key to linking all data about the child, student, as well as adult learner and candidate for attending short study programs within higher education system [5].

The PEN is an individual and unique label consisting of 16 characters and which is assigned to a child, pupil, adult and student in an automated procedure through the UISE at the request of the institution, higher education institution. The PEN is assigned at the first enrollment at the institution, and upon verifying the data against the data from the records kept by other bodies in electronic form [5]. Personal data may be processed for the purpose of compiling statistical reports in a manner that does not enable the disclosure of personal data, in accordance with the relevant regulations. The manner of assigning PEN and applying security measures is prescribed by the Minister of Education, Science and Technological Development [5].

B. The Role of the Law on Higher Education

According to the provisions of Articles 114 and 115 of the previously valid versions of the Law on Higher Education [6], a framework for the introduction of the UISE and the assignment of the PEN was defined. The provisions were very similar to the current provisions of the Law on the

Fundamentals of the Education System [5] but were only partially harmonized with the Law on Personal Data Protection, in the Records section. Amendments to the Law on the Fundamentals of the Education System [5], that is, the introduction of the current articles, made it possible for Articles 114 and 115 in the Law on Higher Education [7] to cease to be valid.

In this way, the Law on the Fundamentals of the Education System [5] took over the authority to introduce the UISE and the PEN in higher education while harmonizing these regulations with the Law on Personal Data Protection. The Law on Higher Education [7] became the so-called related regulation, which is in accordance with the assumption used in this paper.

By harmonizing regulations [5,7] in the period from 2018 to 2020, the UISE has become an instrument for connecting different levels of education, which enables monitoring of all participants in the educational process through a system. The basic goal of its introduction has been achieved.

C. The Rulebook on the Unified Information System of Education

The Rulebook on the Unified Information System of Education - The Rulebook [8] regulates in detail the conditions and manner of establishing the UISE and registers [5], collecting and entering and updating data entered in registers, types of statistical reports based on data from the register [8]. The Rulebook is a bylaw, which originated from the Law on the Fundamentals of the Education System [5]. It is applied in higher education institutions which are obliged to keep registers. The data from the records kept by the institutions need to be consistent with the data in the UISE. In order to establish the UISE and its full functioning in all segments, it is necessary for the higher education institution to access the system through its access account, but with the use of the PEN. The procedure of assigning the PEN to a student when enrolling at a higher education institution (provided the PEN was not assigned to him in the previous level of education) is defined by the Rulebook on detailed conditions and the procedure of assigning the Personal Education Number [9].

The UISE is established and managed by the Ministry. The Ministry provides the higher education institutions with conditions for the safety and security of technical equipment and software, as

well as the necessary resources for the functioning of the UISE [8].

The register of higher education institutions contains the following general data on the higher education institution [8]:

1. legal status: name and seat of the institution; founder; number and date of work permit; number and date of the accreditation certificate; the date of the beginning of the work of the higher education institution; registration number; Taxpayer ID; contacts; current account of budget / own funds;
2. the status of the higher education institution in the higher education system;
3. study programs: name, type, degree, scope, field of study, accredited number of students; number and date of the accreditation certificate, decision of the professional body on the abolition of the study program;
4. realized short study programs and issued certificates;
5. tuition fee;
6. the weekly number of classes according to the study program for each year for lectures and exercises;
7. the language in which the study program is realized;
8. the number of budget and self-financing students per study program and per year of study;
9. facilities inside and outside the seat;
10. legal documents of the higher education institution: Memorandum of Association and Articles of Association;
11. the bodies of the higher education institution;
12. the accreditation of the higher education institution and the results of the external evaluation of the institution;
13. sources of financing: data on financial resources from the budget and from own revenues; data on their spending;
14. other data of importance for the development of the higher education system and for inclusion in the European Higher Education Area.

The institution enters and updates the following data in the register of accredited study programs, [8]:

1) Accredited study program, accreditation, type of studies, scientific field and area, language in which it is conducted, tuition fee, number of budget and self-financing students per year of study, number of students who have completed the study program, other data on the realization of the study program.

2) data on short study programs.

The higher education institution enters and updates data (via its access account and via the PEN entry) [8]:

1. on the student: age, place and country of birth, country of residence, nationality;
2. in order to determine the educational status of the student: previously completed education, language in which the previous education was acquired, the enrolled study program, type of study, year of study, year of first enrollment at the study program, year of completion of the study program, data on ECTS credits and issued documents;
3. in order to determine the social status of the student: the way of financing the studies, the way of providing living expenses during the studies, the use of the student loan, the work status during the studies, parents' level of education;
4. in order to determine a student's health status.

III. EXPECTED EFFECTS OF IMPLEMENTATION OF THE UISE ON HIGHER EDUCATION

The main effect of the introduction of the UISE is that the Government gets a picture of the entire education system in the Republic of Serbia in one place. It is reasonably expected that there are numerous short-term, medium-term and long-term effects of the introduction of the UISE (with the application of the PEN) on higher education.

The UISE has been designed and its implementation has started in order to provide IT support to the rational functioning of the higher education system, but also as a tool for its modernization.

The introduction and functioning of UISE can produce the following effects on higher education:

- ✓ better organization / simplification, efficiency, effectiveness, reliability of business processes in higher education institutions and in the whole system;
- ✓ greater transparency in the work of higher education institutions;
- ✓ unification of the type of data, which higher education institutions exchange with the Ministry;
- ✓ reducing the need for complicated individual information systems for keeping records in institutions;
- ✓ raising the IT basis for the modernization of the process of managing the work of the institution as well as management decision-making based on reliable and verified information;
- ✓ more efficient resource planning and resource management;
- ✓ rationalization of the existing way of financing and preparation of a new model of financing higher education;
- ✓ simplification of monitoring all activities in higher education institutions.
- ✓ quick and comprehensive overview of all relevant data on study programs, institution, employees and students;
- ✓ complete analysis of the higher education system, preparation of statistical reports in order to evaluate the performance of the institution and / or the entire education system;
- ✓ establishing the so-called feedback in communication between domestic higher education institutions; domestic higher education institutions with economy and public administration; higher education system with international organizations and relevant institutions;
- ✓ IT support for monitoring development indicators in the field of higher education as a step towards integration into the European Higher Education Area;
- ✓ obtaining accurate and precise data on the state of higher education as a starting point for personnel and financial reform.

Work of institutions with registers of accredited higher education institutions; accredited study programs; students and employees; enables the

Ministry and the Government to monitor in one place the number of pupils and students, the number of employees at all levels of education, the transition from pre-university to university education. It also provides the opportunity to monitor students from enrollment at primary school through the completion of secondary school to the completion of higher education and their employment. The registers make it possible to monitor the total number of active students during each school year, which has clear implications in the design of budget expenditures for their education.

Indirectly, by statistical processing of data from various registers, the Government can have an overview of the total number of higher education students in the Republic of Serbia and an overview of the number of graduates by scientific fields / areas or school years (or other given criteria of interest for specific analysis).

The structure of graduate students by study programs and scientific fields / areas is a very important piece of information for employers in the economy. Employers are given the opportunity to find professional and competent staff according to their needs through the UISE, and at the same time that staff has legally valid diplomas. UISE also provides feedback to employers on the state higher education system. According to the requirements of employers, the Ministry can encourage the creation and accreditation of certain study programs that produce graduates with pre-defined employment opportunities. A search of the registers of accredited higher education institutions and accredited study programs provides a comprehensive insight into the higher education market and implies raising its competitiveness. Accredited higher education institutions operate on the basis of the Certificate of accreditation of the Institution and the study programs, issued by the National Entity for Accreditation and Quality Assurance. The issued Certificates represent a guarantee of fulfillment of conditions according to the appropriate Standards for accreditation and ensuring the quality of work according to the Bologna principles.

The student register speeds up and facilitates the process of student mobility, but checks the legality of the degree they have obtained.

Based on the data from the UISE, the Ministry can prepare appropriate statistical reports in order to analyze the work or performance of the education system and take corrective measures in order to improve or optimize resources. With the introduction of UISE, the Ministry can also monitor in real time

how much money has been invested in the education of each student and how much return on that investment (through allocations for taxes and contributions by employers) can be counted on. In the long run, the Government will be able to assess which higher education institutions are more successful and which study programs are more attractive for students, and to realistically create an educational policy based on these data.

It must be emphasized that the UISE recognizes a student exclusively by the PEN. Publicity of personal data is no longer required. The use of data from the UISE (along with the PEN) should enable a simpler procedure for the transition of a future student from pre-university to university education while respecting their social status and objectively evaluating the results achieved in high school.

IV. CONCLUSION

The Law on the Fundamentals of the Education System is a key basis for the introduction of UISE in higher education. The legal framework defines the key leaders and executors, monitoring instruments, reporting procedures in the UISE. In this way, the UISE becomes an important instrument for modernizing the work of higher education institutions and a tool for higher education reforms.

Based on the analysis of data from the UISE and statistical reports, the Ministry of Education, Science and Technological Development as well as other government departments of the Republic of Serbia: can draw reliable conclusions about the current situation in higher education, can make accurate decisions for modernization of higher education, can design measures for implementing

reforms and approaching the European Higher Education Area.

It can be considered that the final outcome of the introduction and implementation of the UISE will enable raising the quality of life of the citizens of the Republic of Serbia from the aspect of simplifying the communication procedures of the persons interested with the higher education system while reducing costs of communication. This represents a step towards the development of e-government and the information society as a whole.

The further course of work could include an analysis of the structure of individual registers that higher education institutions are obliged to keep in accordance with the considered regulations, a detailed elaboration of the role of UISE and PEN at all levels of education, etc.

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