

# Systematization of Intellectual and Creative Resources of a Single Information and Analytical Area of the University\*

Nadezhda I. Gallini<sup>1</sup> and Lyudmila S. Anisimova<sup>2</sup>[0000-0001-9412-5071]

<sup>1</sup>V.I. Vernadsky Crimean Federal University, Yalta, Russia

<sup>2</sup>Institutes of Educational Psychology and Pedagogy, Moscow City University  
gallini.nadi@yandex.ru

**Abstract.** The article presents the intellectual and creative resources used in the design of single information and the analytical area of the educational organization of higher education. Designing single information and analytical area of an educational organization of higher education will allow organizing accounting, storage and on-line access to data collected during the work of structural subdivisions of an educational organization of higher education to provide relevant information to the preparation of documentation. The provision of single information and analytical area for an educational organization of higher education is based on a comprehensive model of an integrated information-analytical system for uniting structural units of an educational organization of higher education, providing reliable information about applicants, students, and teachers to employees of educational institutions of higher education working with documents.

**Keywords:** intellectual resources, intellectual and creative resources, single information and analytical area.

## 1 Introduction

In the current situation of reforming the system of higher education in the Russian Federation, the transformation of the sphere of university management as an educational organization of higher education is of particular importance. The priority is to integrate educational and scientific (research) activities in the preparation of future specialists. This trend allows intensifying the process of professional training of more competitive graduates. For effective interaction of the educational and research component and ensuring the attractiveness of educational organizations of higher education as a center for innovative professional training and parallel creation of intellectu-

---

\* Copyright 2019 for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

al capital. The search for mechanisms to ensure such integration, as well as means of quality control and ensuring comprehensiveness in the improvement of professional competencies of employees of a higher education organization, acquires one of the priority values. Properly organized document flow as a direction in the activities, including the faculty, is the key to effective decision-making in the coordinated work of the university as a cluster of professional training and research activities. Of particular importance in the development of a university as a cluster, a kind of association of departments and laboratories is the use of intellectual and creative resources. These funds can be an incentive for the formation of competitive achievements and provide an opportunity to create an effective strategy in the training of qualified personnel to ensure the labor market.

The purpose of the study is to identify and classify the existing intellectual and creative resources used in the design of interaction single information-analytical area for an educational organization of higher education (as cluster elements) based on theoretical analysis.

Research objectives. Identify the existing intellectual resources of educational institutions of higher education. On the bases of analysis of the content of existing resources to determine their aspect diversity in terms of intellectual and creative potential. Forming the classification of these resources as the main single area information and analytical of universities.

## **2 Intellectual and creative resources**

At the present stage of development of society in the conditions of transition of the economy to the sixth technological stage, educational organizations of higher education should pay special attention to the development of intellectual and creative resources for the integrated management of the educational organization of higher education.

The task of the integrated management of the educational organization of higher education is the idea of shaping the creativity of employers, which opens up in three components. Deepening and expanding the necessary knowledge and skills of employees (firstly, it is necessary to expand the professional competencies, knowledge, and skills required for the implementation of project work). Development of the ability to think creatively (using training and education systems, engaging consultants, and conducting trainings). Preparing a system of creative activities (designing a motivational environment that satisfies employees; the effect on internal motivation for the creative activity of employees) [2, 4].

Intellectual and creative resources are based on such human assets as knowledge, qualifications, experience, skills, and competence. At the same time, human assets need to be supported by infrastructure and intellectual assets. For example, to systematize and automation such a human asset as knowledge, it is necessary to use infrastructure assets such as databases and personal computer software, which, in turn, are intellectual assets, namely, the results of creative, research, or inventive activity [1].

Intellectual and creative resources (ICR) of educational organization of higher education can be structured according to three criteria: human, infrastructure and intellectual assets. Further, because of the implementation of the IFR typology, we will determine the types of assets related to the selected classification features (Table 1).

**Table 1.** Typology of intellectual and creative resources of universities

<b>Human assets</b>	<b>Infrastructure assets</b>	<b>Intellectual assets</b>
Knowledge	Database PC software	Results of creative, research and inventive activity
Qualification	Patents for inventions and industrial designs Copyright	Results of creative, research and inventive activity
Experience	Information Technology. "Know-how"	Interaction Tools
Skills	Corporate culture Management strategy	Human capital
Competence	Network communication systems	Resources and results of innovation

ICRs are used in the design of technology for the interaction of structural subdivisions of an educational organization of higher education, based on the providing of single information and analytical area for an educational organization of higher education. The technology is comprehensive information and analytical system for analyzing and monitoring the indicators of applicants, students and teachers of GPAYALTA (integrated IAS GPAYALTA).

Integrated IAS GPAYALTA is a vivid example of an intellectual and creative resource, which the author introduced in 2015 to the management of an institution of higher education Humanities and education science (branch) Academy of V.I. Vernadsky Crimea Federal University in Yalta. The structure of IAS GPAYALTA is based on a meaningful model that provides unified information and analytical area of the educational organization of higher education.

The GPAYALTA technology, which provides a unified information and analytical area for an educational institution of higher education, provides information about applicants, students and teachers to employees working with documentation, structural divisions of the Academy, such as: Educational and Methodological Department, Admissions Committee, Accounting, Personnel Department, Centers, Departments, College and Institutes.

Since students enter the Academy because of the work of the selection committee, which in turn is based on the result of the admission campaign, the External Environment is included in the content model. Also in the conceptual scheme included "The Ministry of Education and Science of the Russian Federation" and the head organization of the Humanities and education science (branch) Academy of V.I. Vernadsky

Crimea Federal University in Yalta, providing in the Academy of control numbers of admission (PCP).

This phase is very important to realize the analysis and the monitoring of the contingent in the higher education institution with the help of an integrated information-analysis system as it responds both to the task of the necessary data visualization in the user's suitable form, and to the task OLAP – extraction of the required data for an operational analysis.

Every participant of the business-processes in the higher education institution has his own idea on the present subject area. One of the tasks for designing an integrated information analysis environment is to generalize these presentations taken by asking the participants of the information process and reviewing the documents. It is preferable to record all the operations in the definite documents in paper or in electronic form. There are different forms of these records: a structural scheme, a flow chart, a table, etc.

The thoroughness of the examination stage identifies in future the efficiency of an integrated information-analysis system work, opportunity to further increase the information resources, adaptability to demands changes to the system [3].

Thus, the problems of coordinating the activities of employees and departments, providing them with the entire amount of necessary information and controlling executive discipline are solved, and management receives timely access to reliable data on the contingent of students of a higher education institution and has the ability to quickly make and implement decisions.

The single information-analytical area of the educational organization of higher education includes a "thin client" of an integrated information-analytical system consisting of three databases. In 2017, the author obtained 2 certificates of state registration of the database "Management of the enrollment of applicants to a higher education institution" No. 2017620317 and "Database: Management of the contingent of students of an institution of higher education" No. 2017620299. On 1 June 2018, a certificate was received on the registration of the third database "Interaction of the structural subdivisions of the educational organization of higher education" No. 2018620789.

With the help of the above databases, information was collected about the contingent of applicants, students, and teachers of the Academy. This information is used to monitor and analyze the work of higher education institutions Humanities and education science (branch) Academy of V.I. Vernadsky Crimea Federal University in Yalta.

Since the work on technology has been going on since 2015, it is necessary to consider the methodology for designing information systems, which defines the process of developing and maintaining information systems in the form of a life cycle. This cycle is represented as a certain sequence of stages and processes implemented on them. Each stage determines the composition and sequence of operations carried out, results obtained, methods and means necessary for carrying out operations, the responsibility of participants and the role of users. This definition of the life cycle of information systems allows you to design and organize a process of joint development and ensure the management of the technological process.

Several standards in the world represent the life cycle of information systems. Some of the standards represent the structure of the stages of the processes of the life cycle of software products; others cover the presentation of the processes of information-analytical systems, set requirements for documents and processes. This definitely creates difficulties in establishing unified requirements for the development of an information system [5].

Let us consider the life cycle ensuring the design of single information and analytical area of the educational organization of higher education. From the beginning, the site was planned to take into account the methodological support of the Department of Informatics and Information Technologies of the Academy, then the main functions of the integrated IAS GPAYALTA were expanded. With this technology:

1. Simplified data collection on applicants, students, and teachers.
2. The search for necessary information about students in all structural divisions of the Academy is provided.
3. The Educational and Methodological Department provides current information about the movement of students in the department and in the EGC.
4. The collection of information from the departments on the subjects of WRC students, with the appointment of a supervisor and reviewer.
5. A tool has been developed for calculating the total load of the Academy with the distribution of the load among the departments.
6. It is possible to share the load on the teachers.
7. There is the possibility of forming staffing departments.
8. A tool for the control panel of indicators (dashboards) has been developed, with the help of which you can quickly obtain various information about the student's continent.

Since the update of the presented technology is always carried out within a limited time frame and all structural divisions of the Academy are involved in it, it was decided to choose Extreme Programming, developed by Kent Beck, from all known development methodologies (life cycles).

Extreme Programming - developed in extreme programming, developed in 1996, includes a flexible software development methodology based on teamwork, effective communication between the customer and the performer during the entire product development project, and development is carried out using consistently developed prototypes.

The Extreme Programming life cycle consists of 8 planning cycles and 8 feedback loops.

Planning cycles:

1. Release plan
2. Iteration plan
3. Entrance test.
4. Stand-up meeting.
5. Pair talks.
6. Unit Tests.

7. Pair programming.
8. Code.

The planning cycles follow one after another, and each one is allocated a certain time. The code is one of the most important planning points since after its implementation there is feedback in all planning cycles and can make the necessary changes in a given planning cycle or all at once.

The interface technology provides single information and the analytical area of the educational organization of higher education is developed in the programming environment Microsoft Visual Unity 2013 (MVS2013).

To ensure information security, an algorithm is proposed for users to work with the resources of the integrated GPAYALTA IAS. With the help of the integrated IAS GPAYALTA, information is accumulated for the necessary reports, which are generated using queries in DataAcessor.cs and are displayed on the site pages when a page is selected.

Integrated IAS GPAYALTA provides information to users of different levels of access, for which using ASP.NET technology with declarative and programmatic methods user access is limited to a set of specific pages.

Integrated IAS GPAYALTA provides users with a tool for managing information - the dashboard. By visualizing the requested information, a dashboard is an effective tool for presenting the work of an educational organization of higher education.

### **3 Conclusions**

The carried systematization of intellectual and creative resources out in the study was carried out, from the point of view, of such signs as human, infrastructural and intellectual assets. This approach allows you determine to the accurate indicators necessary for the design of single information and the analytical area of an educational organization of higher education.

The intellectual and creative resources used by the educational organization of higher education are a significant factor for achieving advantages in increasing the effectiveness of managing the university as a cluster. The development of intellectual and creative resources occurs during the work associated with the accumulation of knowledge, qualifications, experience, skills, competencies and skills improvement in the process of developing new technologies.

The introduction of a single information-analytical area of the educational organization of higher education in the management hierarchy of the Humanities and education science (branch) Academy of V.I. Vernadsky Crimea Federal University in Yalta has a beneficial effect on the provision of level management.

### **References**

1. Bioud, N., Benzakka, W., Caid, K.: Creative commons as activation tools for enabling open educational resources: Toward a new vision of the intellectual property rights in an

- open education environment. In: 2017 Joint International Conference on Information and Communication Technologies for Education and Training and International Conference on Computing in Arabic (ICCA-TICET), pp 1-9. IEEE Conferences. (2017) DOI:10.1109/ICCA-TICET.2017.8095302
2. Dementyev, A.S., Semenov, V.P.: Development Prospects of Certification Services for Compliance with ISO 9001 Requirements Through Implementation of an Online Portal - Database. In: 2019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EConRus), pp. 1382 - 1383, IEEE Conferences, Saint Petersburg and Moscow, Russia. (2019) DOI:10.1109/EConRus.2019.8656706
  3. Gallini, N.I., Makoveichuk, K.A.: Development of Intranet Solution Based on the Model of a United Single Information and Analytical Space Area Of The University. In: 2019 IEEE Conference of Russian young researchers in electrical and electronic engineering (EConRus), pp. 1388 - 1392. IEEE Conferences, Saint Petersburg and Moscow, Russia. (2019) DOI:10.1109/EConRus.2019.8657057
  4. Semenov, V.: Institutional features of strategic management of intellectual capital reproduction. In: 2015 IV Forum Strategic Partnership of Universities and Enterprises of Hi-Tech Branches (Science. Education. Innovations), pp. 52 - 54. IEEE Conferences, St. Petersburg, Russia. (2015) DOI:10.1109/IVForum.2015.7388251
  5. Wang, X., Yin, Z.: Research on cross-platform unified resource access control management system. In: 2017 6th International Conference on Computer Science and Network Technology (ICCSNT), pp. 96-101, IEEE Conferences, Dalian. (2017) DOI:10.1109/ICCSNT.2017.8343666