Digital heuristic paradigm of research and development work in the conditions of university

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Abstract. The article discusses the model of a digital university. The author’s paradigm of research and design work, based on the student social network model, is researched, the scientometric and heuristic aspects of the proposed system functioning are determined. The role and general significance of the proposed methodology is indicated. A schematic diagram of the reduction to the proposed digital paradigm is given. The application of the model and its transparency are substantiated.

1. Rationale
The unconditional priority of the key role (goals) in the training of future scientific and scientific-pedagogical personnel assigned to universities is the implementation of the factual justification of the need for research activity and the justification of its economic and social significance for the recipients of this knowledge. Implemented training programs, based on university and postgraduate provision of state standards, endow the educational element of training with certain professional competencies and skills, but do not give a specific definition of the essential meaning of the training element considered above.
It turns out that the higher the level of training, the less pronounced is the graduation between functional and conceptual education. The university platform remains unchanged for everyone, outside the framework of physical separation.

And bachelors, master, graduate program students test their skills in an unchanging environment. This is largely due to the crisis in the education system, in particular, in the countries of Eastern Europe, however, it shall be noted that its’ role is small. If bachelor program students are taught heuristics, outlined by the framework of certain literature, allowed lists of sources, the recommendatory base of scientific conferences (often held within the framework of the same university), then master program students and graduate program students who receive the skills of teaching the didactic side of educational content, a priori participate in bachelor program cycle. This problem is primordial, but it has a solution.

2. The problem of homogeneity of the educational process for future bachelor, master and graduate program students

The indicated problem also takes place in a qualitatively new, for master program students, type of activity - research and development work in a professional direction. In this intellectual and science-intensive activity, there is still a much bigger problem, expressed by the aspects of representation, visualization and practical validity of a particular object of research. This often scares off students, misleads them, determining the degree of their dissatisfaction. Moreover, this is most evident in a group of graduate students or doctoral students [1].

Their level of knowledge requires the solution of complex applied or theoretical problems, but junior students do not show a stable cognitive component to this implementation, compilation of scientific results. Indeed, not all studies are understood by a large audience. But this does not mean that it is necessary to separate knowledges intended “for all”, and knowledges intended for “few student”. Moreover, the age, which means the empirical picture of the world is not so different between bachelors and graduate program students.

The authors assumed that the student himself must find the answer to the question related to the need to continue professional development within the walls of the university. He also must find the proper co-authors, friends and future colleagues for himself. It is only necessary to explain the heuristic component during the time of the explanation, defining in his mind not only the principle or career side of the issue, but also to give a picture of the “territory of meaning”.

The "territory of meaning" is, rather, a natural-scientific and philosophical concept with a semantic context, however, it is not an ephemeral. It is a didactically elaborated system of acquiring new values by an individual, based on a collective and individual approach to the study of disciplines.

It is aimed at solving the following problems of a practice-oriented plan:

1. Complex interaction between students. Not only the group, stream, course, faculty, but the entire university environment shall be a source of knowledge and a heuristic postulate in its activities. The "territory of meaning" shall offer the possibility of a smooth reorientation of a person who is looking for himself, a citizen of his country, excluding the possibility of a conflict.

2. The semantic nature of the proposed annihilation of homogeneity is aimed at creation of a normalized, graph-oriented, contractual model of information and personal relations of individuals.

3. The heuristic role is to find student principles for finding co-authors among bachelor, master and graduate program students, tutors, and faculty professors.

4. Specific creative activity shall express the multi-vector nature of joint research. It shall be based on models of information and communication relations.

5. It is accepted that the most important in this model is the principle of synergy (involvement in educational work and research (development) of active, regulated and declared students and specialists of various specialties).

In this study, it has been revealed that the splitting of students into clusters is incorrect. Moreover, the tautological homogeneity of the educational process is accepted as an axiomatic component that is utilitarian and inapplicable to the realities of the market. In this regard, for the reasons described
above, it is concluded that a very likely event of the failure of a particular student in the perspective of his life is his professional activity precisely.

3. Semantic model of homogeneity annihilation in the information and communication culture of students of an educational organization

The classical university is designed to unite different and different groups of people, including on a professional basis. An integrated approach always gives a superadditive result, since it allows the creation of hybrid products of conscious human activity, expanding the fundamental and applied use. The principle of superposition in educational genesis is also absolutely pertinent here.

The homogeneity of the educational process, in our understanding, at the psychological level, is perceived under the prism of limited social contacts, often artificial and predetermined by the composition of the group. It also manifests itself through an insufficient study of the social culture and informational component of the majority of university communities, which still have only an informational, reference and scientific-declarative role. This has a detrimental effect, figuratively speaking, on the “power output” of the processing activities of the university [2].

The cumulative value of the proposed model cannot be replaced by an equivalent inaction to homogeneity of teaching methods in relation to master and graduate program students. Perhaps for them, excessive communication interaction with students of junior courses and other specialties will give certain results, but will not at all change the attitude towards the lecture and practical element of their main activity. Over the long years of study within the framework of one university, they will have a ready-made idea of the entire educational process.

For them, the results of communication interaction will only help determine the width of use, the types of input data, and possibly the methods for solving problems. But in the end, using analogies from jurisprudence, justified inaction will determine the superiority over justified activity. The results of the study will not be able to get the proper emotional coloring even in the case of more active communication with an extended contingent of interested persons in real communication. The fact is that there is still a problem that takes place in a number of university communities, expressed by the limited opportunities for direct access to existing indexing and scientometrics systems, specialized journals, publications, repositories of utility models and inventions [3].

![Figure 1. Improving the service of academic research tasks through advanced planning close to economic.](image-url)
The complex query component, which takes place in the scientific environment, even within the university, also minimizes the quantitative aspect of viewing research results. In this case, the final result of the activity of a group of students will be known only by the main author and scientific advisor. And if, we are talking about publications in journals of national or foreign coverage, then it is not a fact that it will be known by the author. In addition, often, the process of research work is associated with a single test, and requires participation in a minute of work. And this is almost excluded, in view of the density and heterogeneity of the curriculum of students in different areas of training, the need for an excessive coordination scheme, the uncertainty of the time management of laboratories, the mode of access to them.

Of course, it is necessary to involve students in the prudent use of time, effort, resources, study and personal time for the implementation of their projects (see figure 1).

In most university environments, the economic (managerial) and technical (accompanying, industrial) vectors of training are expressed. Usually, students of these two integrated forms of training, which are really connected in real life, do not communicate with each other in the context of educational activities. Figure 1 focuses on the parity of cooperation of various specialties, taking into account the third group of future specialists (SoftConstraints), students of natural sciences and humanities, who determine the policy of developing, modeling business processes from the point of view of formal logic [4].

4. Diversification strategy in the design of the digital outline of the paradigm of heuristic research

The work revealed that in order to form a digital paradigm, it is necessary to minimize or completely eliminate similar, logistic and logical conflicts in the educational and production process. Moreover, study is part of a career path and production activity [5].

In particular, full-time training is counted in the total experience in a number of countries of the world, in particular, in the countries of the post-Soviet bloc. Modern realities require not only great independence from students, but also accountability and awareness in their actions. It is believed that there is a need for personal, marker activity logs. Within the framework of the classical university model, this innovation will recommend itself from the best side. Of course, this implies an electronic form of this type of reporting. Such implementation provides automatic tracking of time spent on a task, clear time management of personal time, general dispatching of educational and practical activity processes. Moreover, it will be able to resolve the issue of time allocation and automatic coordination, to maintain information and communication culture on the basis of the considered experience of converging the distance between junior students and master/graduate program students [6,7,8].

The proposed method for reducing the social homogeneity of the culture of research work in the academic environment is also based on the experience of introducing a corporate culture of exchange. The predicative role is reduced to a formal hierarchy of relationships, benefits, scales. For these purposes, a software implementation of a supervisor is proposed in the form of introducing a synchronous production planning system into university life.

What for an APS system is needed? It is needed for planning taking into account production limits. Difficulties in accounting for specific restrictions will be minimized. Heads of practice activities and laboratories heads will be able to draw up a curriculum schedule for the use of units and training stands by different groups of the student scientific community, taking into account industry restrictions or peculiarities inherent in the educational nature. Such systems are already used in research institutes, for example, on quantum machines, in expensive laboratories or in observatories.

It is believed that this definition normalizes the described digital circuit, allowing, along the way, the university to solve issues related to economic policy and optimization. It is believed that free time under an equivalent and open system of auctions can be used for commercial use, and the money for using the equipment of educational complexes can be used to support the university, modernize and grant grants. (it can help trainees in the real sector). Among other things, the proposed heuristic
component allows to visualize the process of laboratory operation, to determine the steps to achieve a certain algorithm [9,10].

Digitalization will also affect the development process due to the same implementation. Intelligent systems like these are powerful layout, visualization, and analysis tools (see figure 2).

Figure 2. Grant diagram showing the stages of application software design by master program students.

5. Findings
Thus, this article emphasizes the need to delegate the functions of mandated security policy and access control, as well as the representation of research and development processing in the digital environment. The solution to the problem is proposed in the definition of a diversification strategy.
Diversification strategy is a marketing strategy that allows a company to identify and develop additional areas of activity that differ from the current products and services produced (in our case: areas and profiles of training, professional skills and competencies). In the face of growing competition, a production diversification strategy is becoming an excellent tool for risk management. It allows to avoid unnecessary focusing of efforts on one direction of the company's work [11,12].

In process of learning each student will build a kind of "CareerPaths" (see figure 3) or a kind of hierarchy of admission (levels) to research or to work (like real life career ladder). It allows him to manifest himself more actively in the heuristic knowledge of the university as a “territory of meaning” [13,14,15]. Personal diversification strategy will also determine his level.

Thus, the digital paradigm of the tract of student research activities within the framework of studying within the walls of a classical university is determined, determining the importance of collaborations based on educational and applied problems. An option of planning of experimental design activities is proposed, and the accumulative value of diversifying professional growth is formalized and justified.

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