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## Концепция формирования проектировочной компетенции у будущих бакалавров прикладной информатики в цифровой образовательной среде вуза

Галлини Н. И.

**Аннотация.** Цель исследования - разработать концепцию формирования проектировочной компетенции у будущих бакалавров прикладной информатики в цифровой образовательной среде вуза. В статье представлены содержание, цель, принципы формирования, виды, формы и структура формирования проектировочной компетенции у будущих бакалавров прикладной информатики в цифровой образовательной среде вуза. Научная новизна исследования заключается в раскрытии аспектов проектировочной компетенции у будущих бакалавров прикладной информатики, состоящей из интеллектуально-креативных способностей, информационно-аналитической компетентности и экономико-социальной грамотности будущих бакалавров прикладной информатики; выражающейся в ценностном отношении к работе с современными компьютерными технологиями, изучении современных языков программирования, кодировании, проектировании и практическом использовании результатов профессиональной деятельности. В результате показано, что концепция формирования проектировочной компетенции у будущих бакалавров прикладной информатики в цифровой образовательной среде вуза необходима для улучшения подготовки программиста, способного выполнять задачи по работе с современными цифровыми технологиями и проектировать новые цифровые продукты, в соответствии с социальным заказом современного общества.

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## The Concept of Design Competence Formation in Future Bachelors of Applied Computer Science in the Digital Educational Environment of the Higher Education Institution

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**Abstract.** The study aims to develop the concept of forming design competence in future bachelors of applied computer science in the digital educational environment of higher education institutions. The article presents the content, purpose, formation principles, types, forms, and structure of design competence formation in future bachelors of applied computer science in the digital educational environment of higher education institutions. The scientific novelty of the research lies in providing insight into aspects of design competence of future bachelors of applied computer science, which consists of intellectual and creative abilities, informational and analytical competence, and economic and social literacy of future bachelors of applied computer science. It is expressed in value attitude to work with modern computer technologies, studying modern programming languages, coding, designing and practical use of professional activity results. As a result, it has been shown that the concept of forming design competence in future bachelors of applied computer science in the digital educational environment of the higher education institution is necessary to improve the training of programmers who can perform tasks using modern digital technologies and design new digital products following the social demand of modern society.

### Introduction

The relevance of the study. In modern conditions of the Russian Federation and with transformations in the systems of social and economic relations of information society and informatization in all spheres of human activity, the system of higher education is intensively developing. The problem of forming design competence of future bachelors of applied computer science in the digital educational environment of the university that the system faces becomes more and more clear.

The analysis of the needs of organizations operating in the industry of digital technology development of the regions of the Russian Federation and the rest of the world makes it possible to declare the potential and the necessity of forming design competence of future bachelors in the 09.03.03 Applied Computer Science field of training with the Applied Computer Science in Management specialization.

The urgent tasks of researching the concept of design competence formation in future bachelors of applied computer science in the digital educational environment of the university are reflected in the implementation of Presidential Decree No. 204 of May 7, 2018 "On National Goals and Strategic Development Objectives of the Russian Federation for the Period until 2024", the "Digital Economy of the Russian Federation" national program (Программа «Цифровая экономика»..., 2018), approved by the minutes of the meeting of the Presidium of the Presidential Council for Strategic Development and National Projects No. 7 of June 4, 2019, Presidential Decree No. 474 of July 21, 2020 "On National Development Goals of the Russian Federation for the Period until 2030", and Presidential Decree No. 490 of October 10, 2019 "On the Development of Artificial Intelligence in the Russian Federation", describing and approving the National Strategy for the development of Artificial Intelligence with a period of implementation from 2020 to 2030, including targeted activities to ensure accelerated implementation of digital technologies in the economy and social sphere of the Russian Federation. These regulatory documents establish the main directions of modernization of information and computer technologies.

The development of the concept of forming design competence in future bachelors of applied computer science is based on the social demand in connection with the need to train bachelors of applied computer science with a high level of design competence. It will allow for the elaboration of a variety of creative digital solutions in the developing digital economy of the Russian Federation. Thus, bachelors of applied computer science upon graduating acquire a high level of design competence in the case of using a set of the practice-oriented educational process. Obtaining a bachelor's qualification in applied computer science with a high level of design competence is possible if the students are trained with an individual-oriented approach.

Thus, the relevance of this study is based on the fact that modern society is intensively developing in the digital environment, and bachelors of applied computer science with a high level of design competence will satisfy society's demand.

The study objectives include the following:

- to substantiate educational conditions of forming design competence in future bachelors of applied computer science in the digital educational environment of higher education institutions;
- to present the forms and types of work to form design competence of future bachelors of applied computer science;
- to develop a conceptual model of forming design competence in future bachelors of applied computer science in the digital educational environment of higher education institutions.

The theoretical basis was provided by the works of researchers substantiating the importance of forming design competence (Бирюкова, Иванова, 2021; Джабатырова, Крафт, Мустафина, 2021; Зайнуллина, Сайтова, 2021), shedding light on the educational essence of the digital educational environment in a higher education institution (Давыдова, Никиян, Барышева и др., 2020; Борисова, 2020; Дурноглазов, Филиппов, 2020).

The system of mutually complementary research methods contributed to the consideration of this problem and the solution of the above-mentioned objectives. The methods were as follows:

- *theoretical methods*, which implied the study and further analysis of various types of reference encyclopedic, scientific, education and methodological, technical literature, regulatory documentation. Comparison, systematization, generalization helped to substantiate in a theoretical manner the model of forming design competence in future bachelors of applied computer science in the digital educational environment of the university. Modeling was used to develop the model of forming design competence in future bachelors of applied computer science in the digital educational environment of the university;
- *information and technological methods*, which involved the development of the technology of design competence formation in future bachelors of applied computer science in the digital educational environment of a higher education institution.

The practical significance of the study lies in the justification of the concept of forming design competence in future bachelors of applied computer science in the digital educational environment of a higher education institution to develop a model of design competence formation in future bachelors of applied computer science in the digital educational environment of a higher education institution. The results obtained in the study are recommended to be applied in the training of future bachelors of applied computer science in higher education institutions of the Russian Federation.

The Humanities and Education Science Academy (branch) of V. I. Vernadsky Crimean Federal University in Yalta was chosen to test the main theoretical and practical provisions of the proposed concept.

### **Educational Conditions of Design Competence Formation in Future Bachelors of Applied Computer Science in the Digital Educational Environment of a Higher Education Institution**

Several stages with various educational conditions are used during the formation of design competence in future bachelors of applied computer science. In the study, the author considers the design and technology stage and educational conditions used in it.

The digital educational environment (DEE) of the university is the main educational condition for the effective functioning of the educational system of forming design competence in future bachelors of applied computer

science. To provide the DEE, the author designs the GPA Yalta informational and analytical educational portal, implemented in the working and teaching processes of the experimental research base.

The digital educational environment of the university applies to educational, teaching and learning, administrative, and managerial activities. This determines that the main information for the digital educational environment of the university is the information about students' education, form of training, form of payment, personal data, i.e. gender, age, other personal information requested during admission, as well as orders about the movement of students, data on the teaching staff that include age, academic rank and/or degree, position and rate of pay, as well as information on educational and methodological activities, such as basic professional educational programs of higher education.

The informational and analytical educational portal is used to support the digital educational environment of the university, containing information on all structural divisions and providing the opportunity to review information about applicants, students, and the teaching staff.

The process of providing the digital educational environment of the university uses the model of a unified informational and analytical educational portal as a basis to unite the structural subdivisions of a higher education institution, making it possible to access reliable data on applicants, students, and teachers to the university staff working with documentation.

Appropriate accounting and storage of data, as well as the online access to the data bank of the educational organization of higher education are relevant because employees working with documentation need to handle this information. To ensure this, it is advisable to create a project of a unified information and analytical space of higher education institutions. In addition to significantly improving the convenience of working with information, this software will help to speed up information processing (Gallini, Kamornickiy, Latysheva et al., 2021).

As mentioned above, at the Humanities and Education Science Academy (branch) of V. I. Vernadsky Crimean Federal University in Yalta, there is a technology designed to provide the unified information and analytical educational space of the institution, based on the informational and analytical educational portal for analysing and monitoring the indicators of enrollment, students, and teaching staff of the higher education institution. To ensure the effective exchange of information between the structural divisions of the higher education institution, the structure of the digital educational environment (DEE) of the university was created (Figure 1).

The structure of the digital educational environment of the university consists of four interdependent and inter-related blocks, which reflect the composition of the unified information and analytical space of the university.

Defining the criteria of the unified information and analytical educational space of the university based on the analysis of modern research (Давыдова, Никиян, Барышева и др., 2020; Борисова, 2020; Дурноглазов, Филиппов, 2020; Ильина, 2019), the authors distinguish key criteria, namely the functional criterion, which is characterized by the scale (volume and degree of severity) and the number of functional objectives solved by the information-software product. The main diagnostic tool for this criterion can be an observation method; the criterion of dynamism, the indicators of which are considered the response time and the speed of execution of a functional task when using the information-software product. These indicators are identified through observation and questionnaires. The criterion of accounting for the individual needs of the user, which includes the key indicator, i.e. consideration of the specifics of different users when solving functional tasks using the information-software product, is diagnosed with the help of questionnaires.

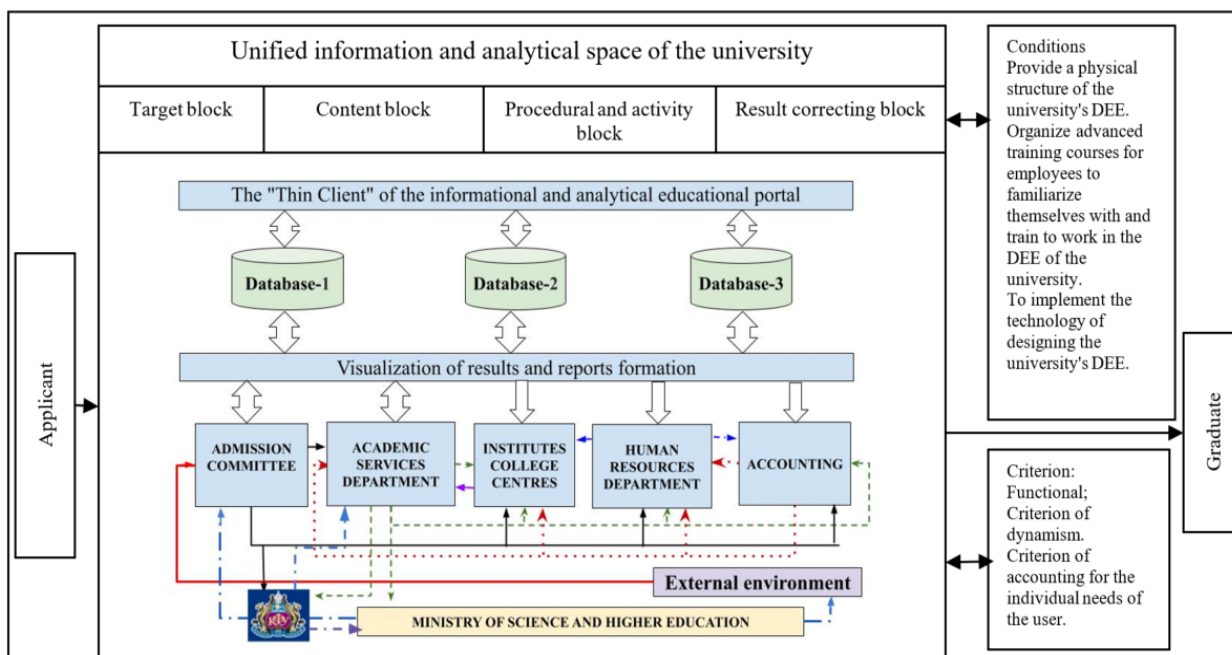
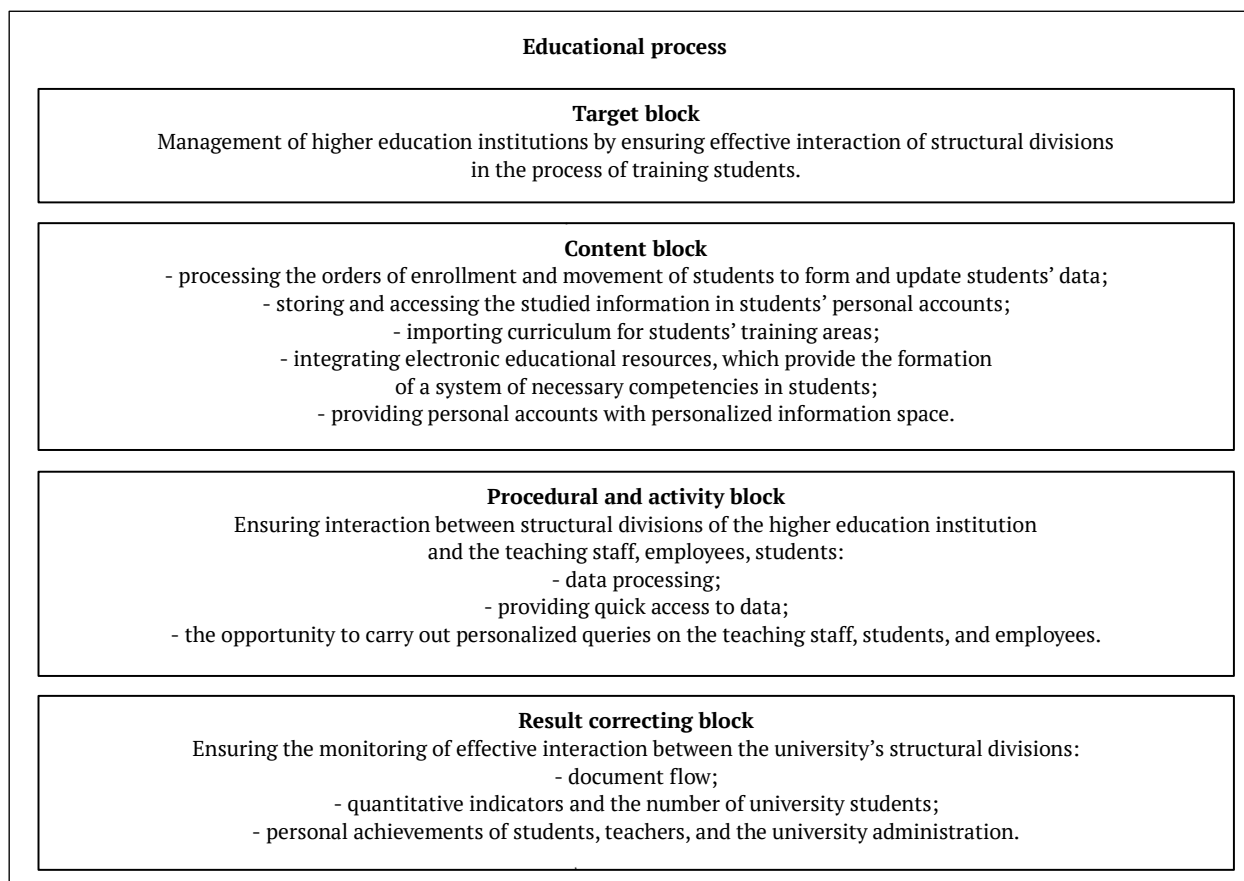


Figure 1. The Structure of the Digital Educational Environment of the University

The components of the digital educational environment of the university, which include *target*, *content*, *procedural and activity*, and *result correcting blocks*, are shown in Figure 2.

Thus, the *target block* of the DEE determines the target, the purpose of the concept and reflects the value-objective component of forming design competence in future bachelors of applied computer science, which is the training of mobile, competitively capable, successful personnel of high qualification. The purpose of the digital educational environment of the university is to ensure effective interaction between structural units in the process of training future bachelors of applied computer science with a high level of design competence. At present, an urgent task of higher education institutions is to enable the formation of professional competencies in graduates, which ensure their universal mobility through interdisciplinary learning.



**Figure 2.** The Components of the Digital Educational Environment of the University

The *content block* of the DEE reflects the information and analytical component of design competence. The content block processes the orders of enrollment and movement of students to form lists of groups and store information about students in the university, as well as the curriculum of groups, students, and integrated electronic educational resources. These provide a system of necessary competencies, consisting of knowledge, skills, abilities, and acquired generalized ways to solve the tasks.

Within the framework of the research, the authors consider the content of the *procedural and activity block* as a qualitative interaction of structural units based on the application of the technology of the unified information and analytical educational space of the university.

The information on the applicants, students, and teaching staff was collected and prepared for it to be transferred to various structural units of the Academy ("Admission Committee", "Human Resources Department" (HR), "Academic Services Department" (ASD), and "Accounting"). The interrelations arising during the exchange of information and joint work between these structural subdivisions are reflected in the scheme of the unified information and analytical educational space of the university.

The "External Environment" is included into the scheme (Figure 1) because applicants come to the Academy after the "Admission Campaign". In addition, there is the "Ministry of Science and Higher Education of the Russian Federation" in the scheme of the model, which provides the educational institution of higher education with the admission control numbers (ACN), i.e. the information about how many students can enter the educational institution to be taught at the expense of budgetary allocations (Gallini, Gorbunova, Popov et al., 2021).

Since the "Ministry of Science and Higher Education of the Russian Federation" relays the regulatory base for the work of the higher education institution to the head University, which processes the received information and transmits it to the Academy, the scheme of the model shows the relationship between the "Ministry of Science and Higher Education of the Russian Federation", the head University and the Academy.

The solid red line in the diagram (Figure 1) shows the connection between the External Environment and the Academy's Admission Campaign. The dash-and-dot line with dark blue dots shows the connection between the Ministry of Science and Higher Education of the Russian Federation, the Admission Campaign of the University and the External Environment because the ACN come from the Ministry of Science and Higher Education of the Russian Federation to the educational institution of higher education. The admission control numbers are received from the Humanities and Education Science Academy (branch) of V. I. Vernadsky Crimean Federal University.

The solid black line shows the links between the Admission Campaign and Academic Services Department, the HR Department, the Accounting, and the Ministry of Science and Higher Education of the Russian Federation because the structural units of the Academy receive information about the Academy applicants from the Admission Campaign, while the Ministry of Science and Higher Education of the Russian Federation receives reports at the time of the monitoring. The dashed green line shows the relations between the Academic Services Department and the HR Department, the Accounting and the Ministry of Science and Higher Education of the Russian Federation because the Academic Services Department informs employees of the Academy's structural divisions about the Academy's applicants and the reports are sent to the Ministry of Science and Higher Education of the Russian Federation during the process of monitoring. The dashed line shows the connection between the Academic Services Department, the HR Department, and the Accounting, the units that need to exchange personal data and have the ability to obtain all the information about the students and the teaching staff. The dashed blue line marks the link between the HR Department, the Academic Services Department, and the Accounting. The dotted deep red line shows the relationship of the Accounting with the Academic Services Department and the HR Department.

In the *results correcting block* of the DEE of higher education institutions, the degree of actual assimilation of information by students of a higher education institution is substantiated. The monitoring of the process of students' competence formation using electronic and educational resources integrated into the unified information and analytical educational space is provided.

The "Thin Client" structure of the informational and analytical educational portal includes the "Database for Enrollment Management in an Educational Institution of Higher Education" (Галлини, 2017a), the "Database for the Student Body Management in an Educational Institution Of Higher Education" (Галлини, 2017b); the "Database of Interaction between Structural Divisions of an Educational Institution of Higher Education" (Галлини, 2018). The "Thin Client" is a platform for organizing the unified informational and analytical space of a higher education institution (Галлини, 2019).

The functioning of all the above-mentioned databases makes it possible to use and manage data on the body of applicants, students, and teachers, as well as structural units of the Humanities and Education Science Academy (branch) of V. I. Vernadsky Crimean Federal University in Yalta. All this greatly facilitates monitoring, as well as qualitative and quantitative analysis of the higher education institution.

So, it can be said that designing the unified information and analytical educational space within an educational institution, which provides opportunities for receiving higher professional education and carrying out scientific activities, makes it possible to increase consistency in the functioning of personnel and departments, allows the university staff to receive and handle all the necessary information and to control the executive discipline. At the same time, the university administration is provided with timely access to objective information about the student body and enrollment in the educational institution of higher education. With these opportunities, it is possible to make quick management decisions and monitor their implementation.

It should be noted that when students study the work of the digital educational environment of higher education institutions, such educational conditions as organizational and educational, psychological, and didactic are used. They accompany the process of forming design competence in future bachelors of applied computer science and are implemented during the design and technological stage, which is focused on forming the ability to operate information systems in practical activities, as well as the ability to use contemporary digital technologies in cognitive activities. Forms of work at the considered stage also included the creation of databases using various database management systems after studying a subject area, the design and the development of databases on the subjects of coursework.

It should be noted that the educational conditions considered in this study act as one of the components of the educational system that forms design competence in future bachelors of applied computer science, reproducing the mixture of possibilities of the digital educational environment of the university, affecting the personal and procedural aspects of students.

The identified types of educational conditions that ensure the functioning and effective development of the educational system in the formation of design competence of future bachelors of applied computer science are represented by the organizational and educational, psychological and educational, and didactic conditions, the characteristics of which are given in Table 1.

So, the identified educational conditions for the formation of design competence of future bachelors of applied computer science in the digital educational environment of the university provide for organizational and educational conditions, which include content, types, and methods, covering the entire cycle of the learning process, designed based on project activities and educational system development. Psychological and educational conditions based on the individual approach of the educational system that comprehensively designs the possibilities of the digital educational environment of the university are foreseen. Didactic conditions aimed at the systematic selection, design, and use of the content, type, and methods of learning forms created during the work on organizational and pedagogical conditions are also provided.

**Table 1.** Educational Conditions Ensuring the Functioning and Effective Development of the Educational System in the Formation of Design Competence of Future Bachelors of Applied Computer Science

| Item No. | Types of educational conditions | Characteristics of the conditions   |
|----------|---------------------------------|---|
| 1.       | Organizational and educational  | Content, types, and methods cover the entire cycle of the learning process, designed based on project activities and the development of the educational system.     |
| 2.       | Psychological and educational   | Individual approach of the educational system comprehensively designing interconnected capabilities of the digital educational environment of the university.       |
| 3.       | Didactic                        | Systematic selection, design, and use of the content, type, and methods of learning forms created during the work on the organizational and educational conditions. |

Thus, with the help of the digital educational environment of the university and the educational conditions described above, the process of developing design competence is taking place, allowing students to learn how to solve professional problems. For example, when training a software engineer to design and develop a database for a company, a pre-project survey is carried out, based on which the physical and logical structure of the database and the layout of the graphical interface of the future information system are compiled. It is necessary to take into account many parameters, systematize data to save the information, and be able to anticipate the further development of the project for its best implementation. The risks and consequences of unexpected force majeure situations are also foreseen.

### Forms and Types of Work on Forming Design Competence in Future Bachelors of Applied Computer Science

The system of bachelor training in the conditions of development of digitalization of the Russian Federation includes technical universities, humanities academies, faculties, and departments of mathematics and computer science, historically established in higher education institutions of the Russian Federation, in which such forms of bachelor training as full-time, part-time and full-time with the use of distance technologies are implemented.

At present, the system of forming design competence in future bachelors of applied computer science is gradually oriented towards *individual creative training*.

The following kinds of work aimed at forming design competence among future bachelors of applied computer science are outlined: progressing through the "Formation of Design Competence among Future Bachelors of Applied Computer Science" elective special course; studying the optional "Project Practice" discipline; studying "Information Systems and Technologies", "Database Design and Development", "Information Systems Design", "Development of Software Applications", "Internet Programming", "Development of Server Web Applications", "Development of Software Applications for ERP-Systems"; developing projects for participation in the all-Russian competitions "Digital Breakthrough", "My Country – My Russia", "Umnik"; participating in scientific conferences with reports on developed projects on the subjects of course projects and final qualification works; completing an internship in organizations operating in the field of digital technology; completing a pre-degree internship in the digital educational environment of the university; developing, implementing and further using projects within the digital educational environment of the university on the subject of graduate qualification work and its successful defense.

Following the requirements of the Order of the Ministry of Science and Higher Education of the Russian Federation dated September 19, 2017, No. 922 "On Approval of the Federal State Standard of Higher Education – Bachelor Degree in the 09.03.03 Applied Computer Science Field of Training", the four-level learning of the content on the formation of design competence in future bachelors of applied computer science is determined for the full-time form of education.

The information structure of the training curriculum for bachelors of applied computer science in the higher education system was developed based on the analysis of the main professional educational program for bachelors of applied computer science (ОПОП, 2019) and curriculum implemented at the Department of Mathematics and Computer Science at the Humanities and Education Science Academy (branch) of V. I. Vernadsky Crimean Federal University in Yalta (Учебные планы..., 2017-2021). It is presented in Table 2.

**Table 2.** The Structure of Bachelor Curriculum in Applied Computer Science

| General Structure of the Bachelor's Degree Program |  | Workload (Credit Units) |
|--|--|-------------------------|
| <b>Block 1</b>                                     | Disciplines (modules), total, including design competence formation                                | 207 CU                  |
|  | Basic part, total, including design competence formation   | 156 CU                  |
|  | Variable part, total, including design competence formation  | 51 CU                   |
| <b>Block 2</b>                                     | Practical program, including research and development (if any), total, design competence formation | 24 CU                   |
|  | Basic part (if any), total, including design competence formation                                  | 24 CU                   |
| <b>Block 3</b>                                     | State Final Examination, total, including design competence formation                              | 9 CU                    |
|  | Basic part, total, including design competence formation   | 9 CU                    |
| Total volume of the program in credit units        |  | 240 CU                  |

The workload of the disciplines and practices of the curriculum is indicated in credit units, where one credit unit equals 36 hours and includes classroom and independent work. The basic part of the curriculum contains a list

of mandatory basic disciplines, while the variable part of the curriculum contains a list of elective disciplines under the Federal State Standard of Higher Education (ФГОС ВО, 2017).

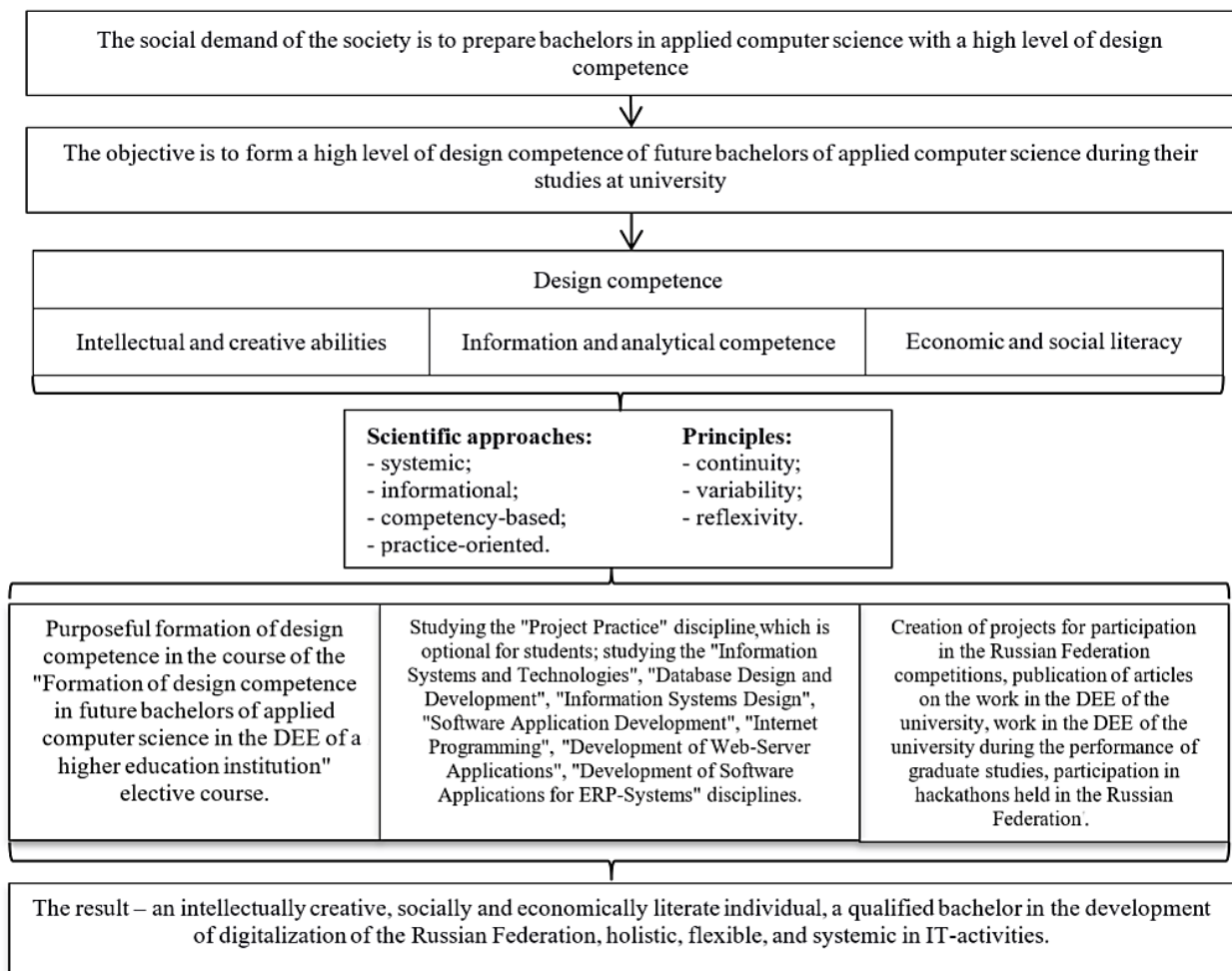
Thus, the use of the presented forms and types of work to form design competence in future bachelors of applied computer science corresponds to the requirements of the Federal State Standard and the social demand on training bachelors of applied computer science with a high level of design competence.

**The Conceptual Model of Design Competence Formation in Future Bachelors of Applied Computer Science in the Digital Educational Environment of Higher Education Institutions**

The probability of substantiating the concept of design competence formation in future bachelors of applied computer science is based on the synthesis of theoretical research (Бирюкова, Иванова, 2021; Глузман, Горбунова, 2019) and the accumulated experience of researchers (Gallini, Gorbunova, Popov et al., 2021).

The systemic, informational, competency-based, practice-oriented approaches and the principles of continuity, variability, and reflexivity form the basis of the concept of design competence formation in future bachelors of applied computer science. When developing this concept, the specificity of higher education institutions is taken into account. The main emphasis in higher education is on the theoretical and informational nature of learning, which contradicts the development of modern society and the need to emphasize learning on the basis of practical activities. At the same time, the personal qualities of future bachelors of applied computer science are formed to increase the level of students' self-organized independent work to motivate the study of disciplines involved in their future professional activities, to increase the level of curiosity and influence the development of personal creative abilities.

As stated previously, the main methodological guideline for developing the concept of design competence formation in future bachelors of applied computer science is the systemic, informational, competency-based, practice-oriented approaches. According to these approaches, the formation of design competence in future bachelors of applied computer science is analyzed in three interrelated aspects: content, functioning, and development. Thus, the concept of design competence formation in future bachelors of applied computer science (Figure 3) promotes the development of design competence in students to a self-developing level. The systemic, informational, competency-based, practice-oriented approaches allow future bachelors to master the necessary and sufficient set of competencies for working with modern information technologies to solve professional problems.



**Figure 3.** The Conceptual Model of Design Competence Formation in Future Bachelors of Applied Computer Science in the Digital Educational Environment of the Higher Education Institution

So, the content, purpose, scientific approaches, principles, types, forms, and structure of the author's concept of design competence formation in future bachelors of applied computer science includes some necessary and sufficient provisions.

The "design competence of future bachelors of applied computer science" is a component of prospective professional competence of an applied computer science specialist, which unites multitasking, multifunctionality, and mobility of professional activities of an applied computer science specialist.

The design competence of future bachelors of applied computer science consists of intellectual and creative abilities and systematization of knowledge, abilities, and skills of informational and analytical competence, economic and social literacy, founded on the systemic, informational, competency-based, practice-oriented scientific approaches and the principles of continuity, variability and reflexivity. These are focused on the integration of various professional functions of future bachelors of applied computer science (design activities, production, and technology activities, organizational and management activities, analytical and research activities) (Gallini, Buzni, Gorobets et al., 2021).

Design competence formation in future bachelors of applied computer science is an *element* of the professional training of future bachelors of applied computer science, expressed in the ability and readiness of bachelors of applied computer science to undertake independent theoretical and practical activities to develop and implement projects using modern digital technologies. The considered system of higher education training is focused on the mastery of psychological, theoretical, practical, and research knowledge.

The system of higher education training of future bachelors in the field of applied computer science satisfies the social demand for the training of bachelors of applied computer science who possess a high level of design competence. The qualification of bachelors is aimed at forming highly professional traits, which are identical to the creative abilities, interests, and competencies corresponding to the professional activities of future bachelors of applied computer science in the conditions of digitalization development in the Russian Federation.

When obtaining the "Bachelor in Applied Computer Science" degree, first of all, it is necessary to prepare a professional capable of working with digital technologies and designing new digital products following the demand of modern society.

Consequently, *the result of the development and implementation of the conceptual model* of design competence formation in future bachelors of applied computer science is an intellectually creative, social, and economically competent personality of a qualified bachelor in the field of digitalization development in the Russian Federation, who is holistic, flexible and systemic in IT-activities.

## Conclusion

Following its aim and objectives, the study carried out theoretical reasoning and provided a practical solution to the scientific problem of substantiation of the concept of design competence formation in future bachelors of applied computer science in the digital educational environment of the university.

The study considers the practical needs of the subjects of educational activities and the requirements of information society to the organization of the educational process in a higher education institution. In the process of research, the following main results were obtained: the educational conditions of design competence formation in future bachelors of applied computer science in the digital educational environment of a higher education institution were developed; forms and types of work on forming design competence in future bachelors of applied computer science were presented; the conceptual model of design competence formation in future bachelors of applied computer science in the digital educational environment of a higher education institution was presented.

The presented conceptual model of design competence formation in future bachelors of applied computer science in the digital educational environment of a higher education institution is based on the social demand, the purpose, components of design competence and contains scientific approaches and principles, utilizing which the necessary result is achieved.

The creation of the concept of design competence formation in future bachelors of applied computer science in the digital educational environment of higher education institutions presented an opportunity to develop educational conditions of design competence formation in future bachelors of applied computer science. In the process of developing these conditions, the characteristics, which the unified information and analytical educational space of higher education institutions as a component of the digital educational environment of higher education should meet, were summarized, systematized, and described. The conceptual framework of the study was specified.

The types and forms of design competence formation in future bachelors of applied computer science identified and used in the study made it possible to provide insight into the features of the content, structure, and functions of the bachelor training system, which are aimed at obtaining a comprehensive result of professional training of bachelors with design competence in the conditions of higher education institutions of the Russian Federation.

The prospects for further research amount to the continuous improvement of educational conditions for the formation of an increasingly higher level of design competence in future bachelors of applied computer science in the digital educational environment of higher education institutions.



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### Информация о статье | About this article

Дата поступления рукописи (received): 04.01.2022; опубликовано (published): 28.02.2022.

**Ключевые слова (keywords):** проектировочная компетенция; прикладная информатика; цифровая образовательная среда; интеллектуально-креативные способности; информационно-аналитическая компетентность; design competence; applied computer science; digital educational environment; intellectual and creative abilities; informational and analytical competence.