

# Intellectualization of Higher Education: An Information and Communication Model

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## Summary

Today the system of higher education needs significant reforms. Intellectualization of the educational process in HEIs aims to improve the quality of educational services. Intellectual information technologies are information technologies that help a person to accelerate the analysis of the political, economic, social, and technical situation, as well as the synthesis of management decisions. The basis for their mastery is information and communication technologies. The purpose of the research work is to identify the relationship between the introduction of information and communication technologies and the increase in the level of intellectualization of higher education. The article substantiates the expediency of introducing information and communication technologies in order to improve the intellectualization of the educational process in higher education. An empirical study of the variables that characterize the level of intellectualization of higher education through the proposed techniques has been conducted. The tendencies characteristic of pedagogical conditions of implementation of information and communication model in the educational process were revealed. It is proved that the level of intellectualization of higher education depends on the implemented pedagogical conditions. The effectiveness of the proposed information and communication model is also confirmed. Given the data obtained during the study and the low constraints that may affect the results of further research on this issue should focus on the study of other variables that characterize the state of intellectualization of the educational process.

## Keywords:

*educational technologies, information technologies, educational environment, innovative education, information, and communication technologies.*

## 1. Introduction

Today, the global educational community is based on the information and communication model, which, in turn, is built on the comprehensive use of information technology. A modern information society is being formed under its influence. Information and communication culture is becoming part of everyday life. Informatization of society, the formation of a new information and communication environment need to modernize the education system [1]. Today it is extremely necessary not just to increase the level of education, but also to form a new type of intellect, a way of thinking that determines the attitude of the realities of the modern, dynamic world [2-3].

Intellectualization of higher education is a phenomenon that helps to accelerate the analysis of the political, economic, social, and technical situation, as well as contributes to the synthesis of management decisions. Intelligent information technology is formed in the development of information systems and technologies to improve the efficiency of decision-making. In this case, any life or business situation - from life partner choice to social conflict - is described by means of a certain cognitive model (cognitive scheme, archetype, frame, etc.) [4]. This model is subsequently used as a basis for constructing and analyzing contemporary events. In this process, the main role is given to the intellectualization of the educational process in the system of HEE. At the same time, the methods and intellectual technologies used do not necessarily have to be inconsistent processes of human thinking [5]. The use of new methods and technologies implies a fundamentally different type of thinking [6-7].

The modern world places new demands on the development of human intelligence, forcing a review of old ways of interacting with the information space. A modern

individual needs to master all the means of working with high-speed information flows: mastering the skills of searching for information, thoroughly processing it, engaging critical analysis, filtering out outdated or distorted meanings, the ability to see the whole in parts, etc. And this requires a process of improving the logical apparatus of thinking, the development of the intellectual sphere as one of the main basic values in the formation of personality. In modern conditions, the most productive technology to achieve this goal is the use of an information and communication model [9].

The information-communication model is a model of providing the sphere of education with the methodology and practice of developing and optimally using information technologies aimed at realizing the psychological and pedagogical goals of teaching and education [10]. This process initiates, firstly, the improvement of education system management mechanisms based on the use of automated data banks of scientific and pedagogical information [11]. Secondly, improvement of the methodology and strategy for selecting the content, methods, and organizational forms of education, upbringing, meeting the objectives of the development of the student's personality in the conditions of informatization of society [12]. Thirdly, the creation of methodological training systems aimed at the development of the student's intellectual potential and the formation of skills without the help of others [13].

Analysis of the influence of the environment on personal development allows us to conclude that it is not only a means of personal development but also a kind of catalyst in the process of self-realization, which can accelerate or slow down this process. The concept of "environment" also reflects the interrelation of conditions for human development. In this case, the presence in the environment, mutual influence, interaction of the environment with the subject of the pedagogical process is assumed [14-16].

The information environment of higher education is understood as a set of conditions ensuring the presence of: a system of means of communication with culture, structuring, and presentation of information, a system of independent work with information, etc. Representation of the information environment as a space of social communications of subjects of education allows to speak about the environment as certain integrity in which fields can be allocated: the information field, the field of psychological interaction, the spatial field of corporate relations [17].

In this study, the information and communication model of higher education is understood as a multidimensional individualized self-organized integrity, saturated with all the necessary components, primarily information, and communication [18-20]. It enables the personality functioning in it to develop his/her creative abilities, as well as self-realization and personal growth. The information and communication model of higher education exists in interrelation with its main components - ICT tools and information systems, resource and methodological support, innovative pedagogical technologies [21]. Considering the information and communication model of higher education

as integrity, we can talk about the special nature of the connection of its components: the change in the content of any selected component leads to a change in the content of others, their links between themselves and the environment as a whole [22- 23]. Thus, the relevance of the research topic is due to the need to clarify the impact of the information and communication model of the educational environment on the process of intellectualization of higher education [24-25].

## 2. Literature Review

In studies, the information and communication environment is understood as a set of conditions aimed at ensuring the interaction between teachers, students, and databanks of information resources of subject areas and the functioning of structures for managing the educational process [6]. Today, there is a growing need to create an educational environment with extensive use of digitalization opportunities. This approach not only increases the level of information and communication competence of all participants in the educational process but is also aimed at the development of creativity and analytical thinking of students. This is how the intellectual educational environment of HEIs based on the use of information and communication technologies is created [19].

Today it is important to build the educational process in the spirit of humanistic ideals aimed at human needs [5]. The core of such a worldview should be the principles of respect for the human being as a phenomenon of the world cultural heritage. Thus, her attitude contains both an assessment of the world and an evaluation of herself in the surrounding reality. Consequently, the humanistic worldview is reflected in the principles of academic ethics of student's perception: respect for personality and beliefs, inclusiveness, tolerance, safety of educational space [22]. The humanistic principle of education is aimed at nurturing universal human values, which historically represent the Euro-Atlantic cultural-value simple: humanity, respect for the individual, dignity, freedom to choose the path of one's own development, unity in diversity, etc. [7].

The intellectualization and the creativization of education are the same. Creativity is the law of intellectual life[23]. The very creativity of education - a broad concept, it includes the involvement of game technologies, the creation of a creative environment, teaching a person creative basics of creative work [4]. The principle of intellectualization of education is carried out through mastering the cultural heritage of mankind, immersion in the cultural environment with its system of values. Intellect is organic only in the space of culture. Culture roots the intellect in national and ethnic roots, in language, in national history, giving it new content.

Informatization and intellectualization of education speaks more about the saturation of the educational space with information and communication and computer technologies, the expansion, and the development of the programming industry [12]. Here it is important to emphasize the creative moment because the orientation of

computerization only on the user level sometimes leads to the opposite effect – the de-intellectualization of students. The combination of educational and research processes allows you to form a new type of thinking[20].

It is not only the identification and development of individual characteristics of students in all forms of interaction with them in the process of training and education. First of all, it is the formation of a thinking person who understands their nature and takes an active position in the social life of the thinking space [8].

Exploring the problem of intellectualization of higher education, it should be said that the trends and directions of development are caused by changes in the nature and content of social production, scientific and technological, and socio-economic progress [25]. Due to the growth of knowledge-intensive and intellectual technologies, the process of intellectualization of higher education is increasing. In modern conditions, the intellectual potential of society becomes the most important basis for its development [3].

The study aims to identify the relationship between the implementation of the information and communication model with the level of intellectualization of higher education. The study hypothesizes that the impact on the implementation of the information and communication model affects the process of intellectualization of higher education. The task was to check whether the obtained empirical data differ from the theoretical probable data. The null hypothesis (H0) was that frequencies were evenly distributed, that is, frequencies were evenly distributed between members of the experimental and control groups. The alternative hypothesis (H1) was that the differences between both distributions were quite significant and were due to the influence of the independent variable associated with the research hypothesis. You can accept the alternative hypothesis if  $\chi^2_{\text{empirical}} > \chi^2_{\text{critical}}$ .

### 3. Methods

The effectiveness of the study is determined and evaluated by both quantitative and qualitative indicators. In the process of pedagogical experiment, they are observed and measured, then compared and analyzed. Then the interpretation of the obtained data is given. As a result, an evaluation of the effectiveness of the experience is formed. The study was conducted in three stages. The first stage of the experiment (2021) - ascertaining. Experimental work at this stage included: study of the process of formation of intellectualization of higher education; analysis of factors reflecting the effectiveness of the use of information and communication model. To determine the significance of various activities for obtaining new information, the respondents of the experimental and control groups were asked to rank ten statements. To do this, the respondents were asked to score against the activity from 1 to 10. The statements offered to respondents are presented in Figure 1 in the "Results" section. The questionnaire, survey, and interview methods were used (the purpose is to identify

motives for studying information technology disciplines). The scale of assessment of students' operational skills (by M. Chobitko).

The second stage of the pedagogical experiment (December 2020 - September 2021) - forming. At the forming stage, the content of the experimental work included the implementation of the pedagogical conditions of the information and communication model. Implementation of control over the course of the pedagogical experiment through questionnaires. Analysis and processing of the results obtained during the experiment, summarizing. Quantitative data obtained as a result of the study were tested with the help of the chi-square criterion.

The base of the forming experiment was the Kyiv National Economic University named after Vladimir Getman. Experimental groups included 100 students; control groups also included 100 students. The comparative study of the results was conducted over 2 years. Students from the following faculties participated in the experimental work: the Faculty of Marketing, the Faculty of International Relations, and the Institute of Information Technologies in Economics. Such a sample allows us to investigate the objective impact of the information and communication model. The survey was conducted in an online format. Respondents were chosen from among the willing respondents by drawing lots. All respondents were preliminarily instructed to answer the research questions honestly and without prejudice. All respondents received consent to use the test results to write research papers.

The main limitations of the study are the finite number of respondents who meet the sampling conditions. Conducting research among students of one university, which, in turn, does not distort the reliability of the results obtained, because the sample is formed in such a way as to cover all executions of students who study at the average HEI in Ukraine.

### 4. Results

The diagnostics made it possible to conclude that modern students pay sufficient attention to information resources of the Internet. The modern young person should have the skills to work with the information published on the web. At the same time, students quite rarely use interactive opportunities of the Internet to realize their creative potential. The average value for each statement was then calculated for all groups (Figure 1).

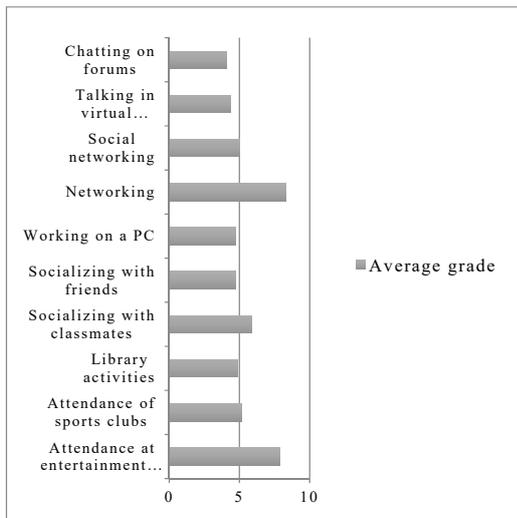


Fig. 1 Importance of different activities for acquiring new information (average) among students

The results of the diagnostics allow us to conclude that for students the most significant type of activity for obtaining new information is the work on the global network Internet. This confirms the assumption that the Internet is the most attractive and demanded factor of socialization in the youth environment.

The study of the level of intellectualization was carried out according to three criteria. The following is an analysis of the dynamics of levels of intellectualization of university students on the motivational and value criterion (Table 1).

Table 1: The results of the study of the level of intellectualization on the motivational-value criterion in students HIE at the ascertaining and control stages of the study

Levels	Contesting stage		Control stage	
	Experimental Group (EG) (%)	Control group (CG) (%)	Experimental Group (EG) (%)	Control group (CG) (%)
Creative	14,5	18,5	35,5	18,4
Productive	44,1	46,7	58,7	53,1
Adaptive	41,4	34,8	5,8	28,5
Total	100	100	100	100

Thus, in the experimental group at the control stage of the experiment more than half of the students had high results on the cognitive criterion (in the control group – one-third of the respondents). At the same time in the experimental group, a small proportion of students at the control stage of the experiment corresponding to the low level of indicators on the cognitive criterion, while in the control group - almost one-fifth.

The validity of the results of the study and confirmation of the hypothesis of an increase in the level of media culture on the cognitive criterion was tested using a two-sided chi-square test (Table 2).

Table 2: Summary table of the distribution of empirical frequencies (motivation-value criterion)

Respondent groups	Creative level	Productive level	Adaptive level	Total
Experimental	19	31	2	52
Control	9	26	14	49
Total	28	57	16	S=101

Further, a table of theoretical frequencies was compiled. The values are shown in table 3.

Table 3: Distribution of theoretical frequencies (motivational and value criterion)

Respondent groups	Creative level	Productive level	Adaptive level	Total
Experimental	14,4	29,3	8,2	52
Control	13,6	27,7	7,8	49
Total	28	57	16	S=101

Table 4 shows the calculated value of the chi-square criterion.

Table 4: Calculation of the  $\chi^2$  value (motivation-value criterion)

Category 1	Category 2	Empirical (E)	Theoretical (T)	(E-T) <sup>2</sup> /T
Experimental group	Creative	18	13,4	1,47
	Productive	32	28,3	0,10
	Adaptive	2	8,1	4,64
Control group	Creative	8	13,4	1,26
	Productive	26	27,3	0,11
	Adaptive	17	7,8	4,97
$\Sigma =$				12,53

Since the obtained value  $\chi^2_{empirical} (12.53) > \chi^2_{critical} (9.2)$  we can reject the null hypothesis. It can be argued that the implementation of the developed system of pedagogical conditions contributes to the intellectualization of higher education.

### 5. Discussion

Education is the main mechanism of the progressive reproduction of public intelligence, and intelligence of each individual [8]. Therefore, a fundamentally new model of thought formation begins to operate in the educational process in order to ensure the sustainable development of humanity in the XXI century. This controlled model reflects the natural evolution of humanity and is based on the principle of advanced development of human intelligence, a new quality of public intelligence, and the quality of all social institutions. The very process of intellectualization of education cannot be regarded as an extensive accumulation of knowledge and mechanical use of information and communication and computer technology to implement the function of intelligence [9]. The main emphasis should be on its qualitative restructuring based on the assimilation of new pictures of the world and ways of interaction with reality. According to all of the above, the main task, way, and method

becomes the intensive information and communication paradigm, which changes the quality of the very intellectualization of education [22]. Let us distinguish the main features of the intellectualization of education: fundamentalization and universalization of education, humanization of education, the creativity of education, intellectualization, informatization of intellectualization of education, and a combination of educational and research processes [5]. Fundamentalization - strengthening the interrelation of theoretical and practical preparation of a young person for modern life activity. Special importance is given to profound and systematic mastering of scientific-theoretical knowledge in all disciplines of the educational system curriculum, be it school or university [17].

Fundamentalization and universalization of higher education, which covers the whole system, cannot neglect advanced educational models. Important aspects of fundamentalization are: the mathematization of knowledge, involvement of new sections of “quality mathematics”, communization of knowledge; emphasis on the formation of a unified scientific picture of the world, problem organization of knowledge, mastering of new paradigms of knowledge organization, in particular the new system of evolutionism [19-20]. That is why the information and communication model together with the space of information and communication environment of HEI is the basis of the process of transformation [21]. The main prognostic goal of the pedagogical system of intellectual-developmental learning in HEIs is to ensure compliance with the objective trend of intellectualization of professional training, which is characterized by deep intellectual saturation of the content of requirements for graduates of higher education institution [12]. The main methodological approaches in designing and implementing the pedagogical system of intellectual-developmental learning are the system approach, which allows to determine of the structure, content, and functions of the system of intellectual-developmental learning, develop the basis for pedagogical management of the process of forming intellectual skills; personal approach, aimed at shaping the personality of the future specialist, his intellectual potential. It should also be noted the activity approach, which focuses on the formation of an integral structure of future professional activity. And, finally, the integrative approach allows to harmonize the goals of the higher and intellectual development of students [15].

## 6. Conclusion

In modern society, the development of information and communication technologies has a huge impact on the educational process. These technologies can be effectively used not only in the process of knowledge transfer but also in the management of the professional educational organization

as a whole. Specifically, the information and communication model lies at the base of the intellectualization of higher education. First of all, it helps students to master not only professional competencies but also the ability for independent analytical thinking. The study aimed to establish the relationship between the implementation of the information and communication model and the intellectualization of higher education. The results of the study confirmed the hypothesis that the level of intellectualization of higher education directly depends on the degree of implementation of the information and communication model in HEIs. However, the study has a number of limitations. Thus, this study considered only part of the variables that characterize the degree of intellectualization of higher education. However, the reliability of the instruments and the validity of the data obtained, confirmed by the results of statistical analysis, allows us to unambiguously assert the correctness and validity of the conclusions. Further research on this issue should focus on the study of other variables that characterize the intellectualization of higher education.

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