

Didactic Potential of Multimedia-Technology in the Development of Students' Informational Culture

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Abstract

Background/Objectives: This article examines the main aspects of the informational culture. **Methods/Statistical Analysis:** The analysis of the informational technology applications was conducted. Didactic aspects of the use of multimedia technologies in educational process were presented. **Findings:** The student's personality should be the morality as both an internal and spiritual quality of the person's nature, his/her need to act in accordance with the requirements of ethics and morality, that is, the moral consciousness. It consists of three components: Moral knowledge, moral beliefs and moral necessity. Moral knowledge is a basic knowledge of ethics and morality, which includes the professional activities that the student receives in the course of teaching computer science. Moral persuasion is students' confidence in their actions based on experience and knowledge, which is a higher stage of development of a person and his/her consciousness, because they are based on a deep and comprehensive assessment by a person moral standards known to him/her, proven by practice and his/her internal approval. The moral requirement is the highest degree of person's moral consciousness. It is characterized by the presence of the moral requirements of compliance. **Applications/Improvements:** Both positive and negative moral and ethical norms were formed, thus, based on the peculiarities of the development of the information society in general, which are expressed in lagging behind the developed countries in the field of informational technologies, as well as insufficient number of highly qualified specialists in Kazakhstan. The latter problem is now successfully being solved in our country.

Keywords: Computer, Informational Culture, Literacy, Multimedia-Environment, Software, Technologies, Telecommunications

1. Introduction

1.1 Introduce the Problem

At the present stage general questions of theory and practice of informational culture, basic concepts and types, as well as legal and moral aspects are being developed. Thus, O. V. Efimova, V. V. Morozov and N. D. Ugrinovich¹ interpret informational culture as the acquisition of knowledge and skills in informational technology area are also say that a person should be familiar with ethical and legal standards in this area.

A number of scientists in their studies²⁻⁴ give significant attention to the role and impact of global informational networks for cultural development, as well as

the principle of communicativeness in the informational activities. Thus, V. N. Mikhaylovskiy⁵ believes that the informational culture is a new type of communication, which gives "the possibility of free exit of the individual to the informational being"; free "access to the informational being at all levels from global to local" and "new thinking patterns formed as a result of person's liberation from the routine informational and intellectual work". According to A. P. Sukhanov⁶, informational culture "is the level of that what is achieved in the development of informational communication between people, as well as the characteristics of the informational sphere of human activity".

In his works V. L. Latyshev⁷ exploring the informational culture identifies two basic components:

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- Computer literacy is the ability to work with computer technology;
- Informational literacy is knowledge of basic rules of getting, receiving, storing and processing information as well as the ability to use specific techniques of their implementation.

Thus⁸ define personal informational culture as “a set of rules of human behavior in the information society”, “a person’s ability to realize and master informational picture of the world as a system of symbols and signs, direct and return informational ties to freely navigate in the information society and adapt to it”.

According to⁹ the idea of informational culture is “the ability to work specifically with information and to use it for receiving, processing and transmission of computer informational technology, modern technical tools and methods”. An integral part of the informational culture is the ability to use computer informational technology “both for automation of routine operations and in extraordinary situations requiring unconventional creativity”.

1.2 Explore Importance of the Problem

Comparing points of view on the essence of the concept of informational culture, we tried to highlight the grounds for its definition that will form the basis of the systems studied by us.⁹⁻¹¹, etc.

- Knowledge and skills for the effective use of information;
- Knowledge of the possibilities of computer informational technologies and the ethical and legal standards for its use as well;
- Ability to apply informational technologies in one’s work and skills to work with various information as well: Extraction, representation, processing, while using modern tools and methods;
- Creative use of computer technologies in practice.

1.3 Describe Relevant Scholarship

Referring to the analysis of psychological and pedagogical literature on the issue of personal informational culture development¹²⁻¹⁴, which showed that a significant role in its formation is given to the education system. Despite the fact that the elements of personal informational culture are laid in society from childhood, its formation occurs in the computer science studying process. This school subject, according to many researchers, forms a

certain outlook in the field of informational sphere and acquisition of informational culture, i.e. the ability to work with information purposefully and professionally using it for production, processing and transmission of informational technology and the corresponding hardware and software.

We will specify what we mean by informational technologies. The term “technology” is derived from two Greek (Latin) words: “techno” – art, skill, craft, and “logos” – science. The usage of this concept regarding the material production is generally recognized. V. Dal defines it in his dictionary as “the science of technics, technics-art knowledge, skills, working methods and their application in business.

Most often the term “technology” is used in the production process and involves a system of methods, results and resources, the use of which leads to pre-planned results of operations, guarantees getting product of the required quantity and quality.

Information is one of the most important resources of the community, along with the same traditional ones, as minerals, which means that the process of its processing by analogy with that of material resources can be perceived as the technology. N. V. Makarova gives the following interpretation of informational technology – it is “a process using a set of tools and methods for collecting, processing and transmission of data (primary information) to obtain information about the new quality of the state of the object, process or phenomenon (information product)”¹⁵. Informational technology applied to information resources, contributes to the creation of an information product.

In the scientific literature there are still differences in the definition of “informational technologies”. Thus, according to V. I. Gritsenko and B. N. Panshin¹¹ informational technologies is a set of crucially innovative systems and methods of data processing implemented in organizational management systems representing integral technological complexes and providing a direct creation, transmission, storage and display of cost-effectively informational product and in accordance with the regularities of such environment in which the informational technology develops.

At present, the informational technology has gone through several evolutionary stages; it has been transformed with the development of scientific and technical progress. The advent of the personal computer determined the new stage of its development and consequently

the name changed, an attribute joined, i.e. one of the synonyms “computer”, “new”, “electronic”. In recent years the usage of the term “new informational technology” which involves the processing of information using computer systems may be found in scientific and specialized, as well as journalistic literature more and more often.

Since the theme of our research is studying the process of formation of students’ informational culture in the education process, we will consider some informational technologies widely used in teaching: Computer telecommunications, multimedia and educational technologies. We will dwell on each of these issues in more detail.

We will start overview from computer telecommunications as one of the leading forms of informational technologies, as they are the most significant and promising both for the formation of informational culture of the student personality and for education in general.

There will be broad prospects opened up by computer telecommunications in the pedagogy at the present time and in the near future. New approaches to the use of telecommunications in education are represented in¹⁶⁻¹⁹.

If we analyze the development of computer telecommunications in the last ten-fifteen years, we can see that their applications were greatly expanded. They started to be used and became a powerful tool of world cognition in education.

Computer telecommunications are developing type of informational technologies using global computer network. The computer network gives an opportunity to work with e-mail. The importance of email includes the some issues. It:

- Encourages and facilitates teachers’ experience exchange on different subjects;
- Increases the students’ interest to the education course, in which it is used;
- Extends the communicative practice of students, helps improve written speech;
- Makes possible the use of new methods, based on a comparison of their own data and of those received via e-mail¹⁷.

Being distinguished by a high degree of interactivity, computer telecommunications help create a unique educational and cognitive environment, i.e. environment used for a solving a variety of teaching tasks, such as cognitive, informational, cultural, logical and others¹⁸.

The main feature of educational and cognitive environment is that it is suitable both for mass and for

individual education and self-education. In addition, this environment, combining functions of computer education with the use of multimedia and communications proper is characterized, according E. S. Polat² by certain properties:

- Ability to teach skills of literate speaking, writing and presentation the results of work as well;
- Conditions for the development of creative thinking;
- Conditions for the transformation of education through the telecommunications network in the social and collaborative process;
- Concentration of all interaction participants through a network on the information proper (on particular text message) and not on the external personal attributes of the author;
- Conditions for the creation of a “virtual classroom”, empowerment of capabilities of group and project-based education.

Thus, we can see that all of the above presented information technologies contribute to the formation of informational culture of learners in general and students in particular.

Current researches in the field of informational technologies show that new media education is developing rapidly, it can also be identified as one of the most promising areas, which contributes to a person’s information culture formation¹⁹.

It is obvious that the multimedia educational technologies help master not only the substantive knowledge and skills, but what is important for us give the possibility for the active development of the individual’s personal qualities. On the basis of constantly updated forms and methods of education a unique opportunity for the organization of creative activity of students emerge in terms of multimedia educational technology.

The forms of organization of multimedia technologies are extremely immense. At present and in the near future a very promising educational technology is a method of group research projects that simulate real work of the scientific community. In¹⁶ it is noted that such activities include:

- Original motivation of the study; detection of some paradox, the problem task statement;
- Search for the paradox explanation, construction of hypotheses;

- Carrying out researches, experiments, observations and measurements, literary investigations to prove and disprove hypotheses, explanations;
- Group discussion of the results, preparation of the report, scientific conferencing;
- Solving a question of the practical application of research results; development and protection of the final draft on the topic.

Multimedia as an educational tool has certain technical, pedagogical and didactic capabilities and may be considered in three aspects: Informational, communicational and as a means of real individualization of education.

1.4 State Hypotheses and Correspondence to Research Design

In our opinion, the leading functions of multimedia-programs used in the education process are explaining, informational, communicational, heuristic modeling, systematizing, motivating and developing.

To improve the effectiveness of media use the method of construction activities is necessary in accordance with the individual needs of students, taking into account the personal educational style, didactic multimedia capabilities for the development of informational culture; optimal selection of educational multimedia software and their combinations in accordance with the lesson objectives, students' qualifications, peculiarity of informational culture development; compliance with general scientific and didactic principles of multimedia usage.

Due to the variety of their characteristics and functions multimedia is the means of development of various spheres of students' individuality, which makes their application necessary and possible within the context of the orientation of education for the development of informational culture of students.

It should be noted that, in our opinion, the effectiveness of the use of multimedia as a didactic education environment is realized not by increasing the combined modalities of perception provided by multimedia-programs and computer facilities, but by monitoring the psychological and pedagogical state of a learner and customization of multimedia-product on individual cognitive style of the learner, ensuring optimal conditions of communication in the educational environment, including the teacher, multimedia-environment, the student, the real (or virtual) partner (s) of education.

An essential component of the education situation with the use of didactic multimedia-environment should be efficient impact, but not the information submitted with the help of various means, which should not be too easy (as, for example, N. V. Klemeshova believes¹⁴), and should meet the "student's zone of proximal development" to update the development situation.

2. Method

Without rejecting the possibility of the productive use of multimedia in various (including traditional) models of education the "controlled discovery" model is proposed as the most promising model of education which is aimed at creation of students' educational and professional work. In this model the education process is accompanied by the most efficient use of multimedia as a didactic means, active education methods for the development of students' informational culture (case study, the method of creating "portfolio", project approach, etc.) are used. "Controlled discovery" model being based on the principles of subject-oriented approach to education assigns an active role (coordinating and guiding function) to the student. Design and creative and situational education models are the closest to the model of "controlled discovery" in modern pedagogy, which are widely spread in the domestic pedagogy and embody the basic characteristics and principles of "controlled discovery" developed in foreign science.

2.1 Identify Subsections

Methodological educational systems, built before, in our opinion, affect mainly the education structure and content and to a lesser extent the process, i.e., the interaction between the subjects of the educational process, the nature of their relationship and mechanisms of students' informational culture development. According to the provisions of humanistic psychology, it is a process as the communication sphere – that is a sphere where all education modifications should occur. According to²⁰ "the possibilities inherent to any innovation related to the contents cannot be fully realized without accompanying changes in the process that determines the nature and peculiarities of interaction between a student and a teacher". In opinion of²¹ computer technologies used in education, help develop general strategies of cognitive activity, which may be used in a wide range of more specific areas of knowledge, i.e., allow developing education technologies and not just the

sum of knowledge and skills. Due to combining different types of information (audio, video, graphics) and telecommunication technologies multimedia allow students to manage the education process, increase group interaction, “provide immediate access to an abundant database of information, encourage the creation of unique forms of communication by each participant and allow getting an immediate result”.

2.2 Measures and Covariates

Since teaching is a personal process of interaction between a teacher and a student (or group of students) using a computer program as a tool and a resource of knowledge, educational communication should be equally “assigned” both by a teacher and a student (group of students) and promote the realization of educational objectives of educational process subjects. Educational process can be based both on the individual scheme of interaction student-multimedia-environment-teacher (Figure 1) and on the group scheme in models of local and global network of virtual classes (Figure 2).

In our view, the apparent cause of the rejection of a number of informational educational technologies is an imposed declarative style of educational impact directed from the “outside” of the formal education system. To achieve a real productivity educational process should be built so that the

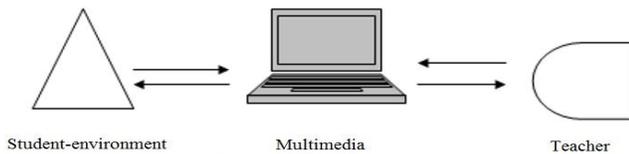


Figure 1. Model of the educational process with interactive multimedia-environment usage (in the student-media environment-teacher system).

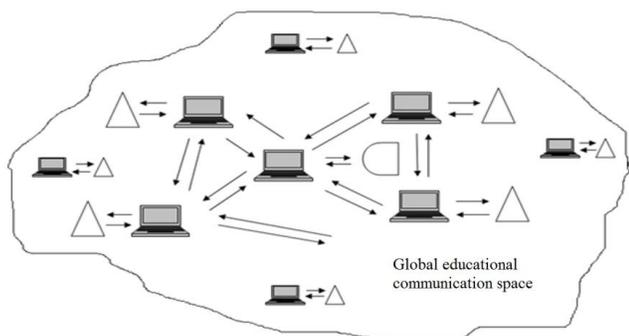


Figure 2. Virtual classroom based on hypermedia technology.

teaching directed from the “outside”, would give place to the teaching directed from the “inside” (Figure 3).

Thus, multimedia-technologies, assigned by the subjects of educational process are a cognitive tool of self-actualization and personal development, a tool for organizing educational activities and simulations of “meeting” situations in the educational communication of virtual reality for the formation and development of students’ informational culture (Figure 4).

All this is characterized by a certain point in time and space, where the “teacher-student” relation focuses on identifying the problem and appropriate knowledge. There may occur situations that there is no ZPD (Zone of Proximal Development) and there is no need in any teacher or class”. Most often, the student needs help and explanations, wherein the environment of virtual education and multimedia technologies just can assist in the identification of specific difficulties (specific ZPD) and an individual approach to a certain student in the problem solving situation and the development of informational culture. In Figure 5 we present a tripartite scheme of the

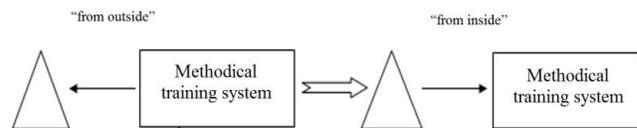


Figure 3. Development of methodical system of training.

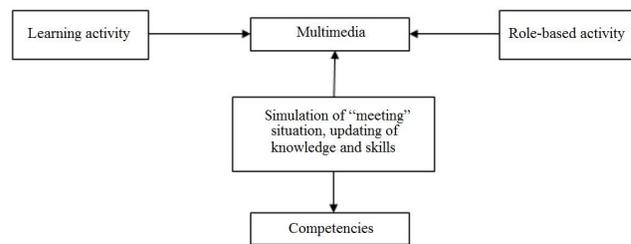


Figure 4. Didactic multimedia capabilities.

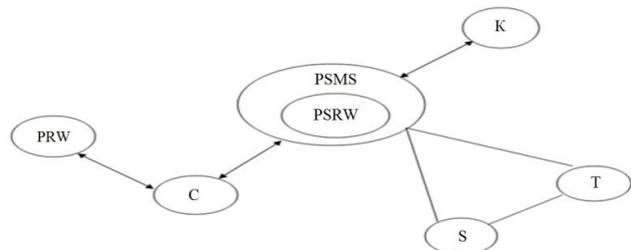


Figure 5. Interaction between the subjects of the educational process in conditions of using multimedia as an environment of development of students’ information culture.

relationship between students and teachers, aimed at solving the problem in terms of immersion of participants of the educational process into the hypermedia environment. There are the following notations at the diagram: L – Learner, T – Teacher or electron mediator, PSRW – Problems Solution of Real World, PSMS – Problems Solving in a Model Situation, PRW – Problems of Real-World, C – Competence, K – Knowledge (Figure 5).

Multimedia-environment should be organized in such a way as to blend in with the activities to develop informational culture.

At that closeness of the teacher's teaching methods (developer of educational multimedia-program) to individual knowledge style of the student plays an important role. The advantage of multimedia-environments is in the ability of individual impact on the effective features of the perception of educational material and in the flexible adaptation of computer education environments.

We will dwell briefly on the education styles.

Multimedia-programs used in education, often only just declaratively support the individualization of the educational process, in the best case, this individualization consists only in temping material and the boot sequence of the individual modules of the program.

The best educational effect is achieved when the student's cognitive style is the same as the cognitive logic of the program (of its developers). Otherwise, there is motivational, psychological and cognitive gap that teacher can sometimes correct, but does not overcome. The same declarativeness is marked by us in the individualization of education by efforts of teachers in classrooms with many students as well. When the audience is 20-35 people per teacher to talk about the real personality is impossible.

The "education style" term is described in different ways.

Most of people understand the education style as beliefs, preferences, behavior features that students use to facilitate the education process in this situation.

According to R. L. Hon²¹ educational style affects three areas: Cognitive, physiological, effective. "Cognitive styles have been defined as "information processing habits representing the learner's typical mode of perceiving, thinking, problem solving and remembering"²². Physiological style is associated with the biological capacity of the body and includes reactions on the physical environment that can affect the process of education (for example, a tendency to night classes or preference of a warm or cold room). Affective style includes such personal and emotional

characteristics as persistence, propensity for joint or single classes and the rejection or acceptance of an external reinforcement. In accordance with these binary opposites a person may have four possible combinations of styles: Concrete-sequential thinking, in which one prefers to work directly with the material; concrete-random thinking, when one selects more experimental approach to study; abstract-sequential thinking, suggesting a tendency to work with symbols; abstract-random thinking when students prefer disordered study space and gladly use imagination in solving problems. In the two-dimensional coordinate system Gregorc's typology²³ looks as follows (Figure 6).

In his research Gregorc²³ concludes that disappointment in the classroom, poor performance, omission may be the result of students being in education environment inappropriate to their style of thinking (for example, education in a group where the teacher has another style).

There are other classifications of educational styles. Thus, in the European high school the most common is Kolb's approach²⁴ in which there are two main criteria in determining the style:

- Concrete or abstract;
- Active or passive.

The combination of different styles can be represented on a two-dimensional field as it is shown in Figure 7.

In accordance with combinations of selected criteria a student can have one of four predominantly expressed educational styles:

- Analyst-specific and passive. He specifically has a passive mindset. He prefers when the teacher analyzes the world with examples and facts.
- Applicator (abstract and active). He prefers to explore the world with simple structures and conclusions.
- Scientific (abstract and passive). He prefers to analyze the world by constructing links and structures.

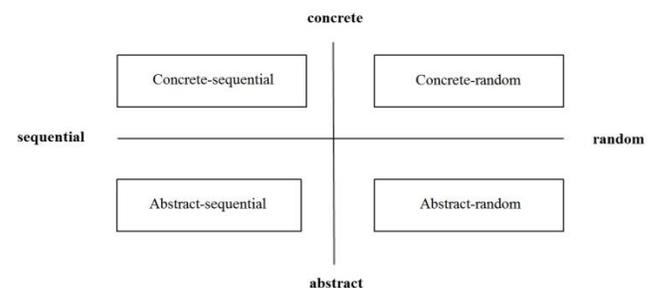


Figure 6. Gregorc typology in two-dimensional coordinate system.

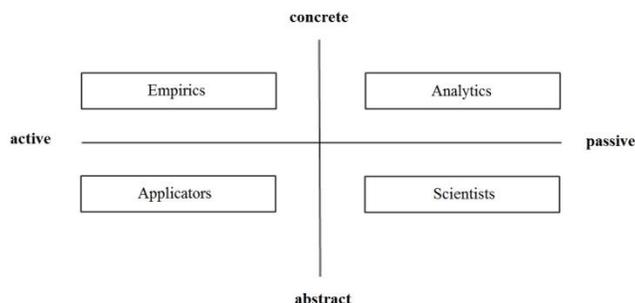


Figure 7. Combination of different styles.

- Practitioner (concrete and active). He tries to understand the world through his own observations and research.

The differences in elements of educational styles and preferred modalities of perception are singled out in these works. The catalogue of educational styles created by these studies allows assessing personal preferences due to various external impetuses (sound, light, etc.), social preferences (working alone, working in pairs, etc.) and physical impetuses (the need in a limited time, the need to move during lesson, etc.).

In the works of many psychologists it is shown that students achieve the best results when their preferences in educational styles are sequential with the teaching methods.

After reviewing the different educational styles, we have compiled a map of conceptual educational styles (see Figure 7).

As a result of consideration of individual cognitive styles, a teacher can provide students with the selection of appropriate materials, make changes in the educational environment, meeting students' individual characteristics and where it is possible, perform the adaptation of educational tasks. For the teaching practice it would be nice to be able to identify and adapt the preferred style to the educational environment and provide educational material thus, as to develop the strengths of students. Unfortunately, in a situation of traditional education this is a very daunting, labor-intensive and practically compromised task.

The style of education involves the interaction, based on the coordination of students' abilities and teaching techniques. In other words, individual characteristics or abilities should be agreed with the position of teacher for adaptation of education conditions in order to achieve more effective results. Accounting for differences based on the preferences and inclinations of students seems possible in the conditions of the use of multimedia-technologies (Figure 8).

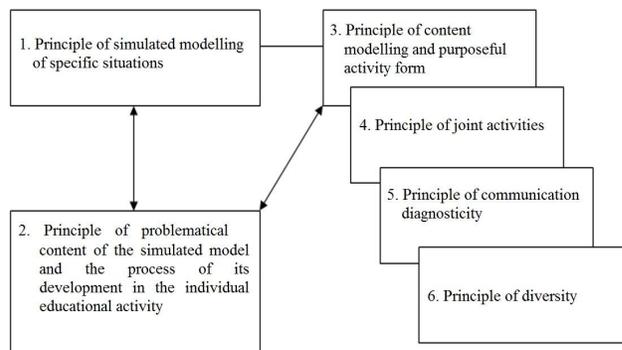


Figure 8. Interpretation of the educational multimedia situation.

Modern multimedia-products, sequential with the principles described below should facilitate the development of informational culture of students. It should be noted that the very structure of the multimedia-environment can both provide the student with an opportunity to develop informational culture and to destroy knowledge. In the interpretation of the situation of the educational multimedia a scheme of reference of the principles of multimedia design is presented in Figure 8.

After reviewing and analyzing various Russian and foreign multimedia-programs, we concluded that the developers and firms distributing multimedia often only declare the above-mentioned principles. At best there are only the 1st and the 3rd principles that are used, without any real consideration of individual preferences of communication, motivation and ways of activity. We offer the above presented specification of principles for the implementation of individualization of education and competence-based approach.

Principles of designing multimedia educational programs containing the development of informational culture of students are as follows.

- Consideration of all kinds of students' motivational needs, realization of personal interests and preferred learning styles. As a consequence of this principle implementation, the introduction of some psychological tests for the identification and registration of the above mentioned factors can be recommended. These tests allow identifying students' learning styles:
 - Motivation of education (for example, Motivation to success tests²⁵);
 - Assessment of health, activity and mood (HAM technique²⁶);

- Preferential styles of information perception (auditory, visual, kinesthetic);
- Color priorities (the Lüscher color tests²⁷);
- Nature of problems solution (expert, organizational, communicational, tactical – Aminov-Chalvin preferences questionnaire²⁸);
- Research of educational styles (result- or development-oriented – N. A. Aminov's Finger Tap Test²⁸);
- Research of thinking types (visual-active, visual-figurative, verbal-logic);
- Research of thinking styles (e.g., A.A. Alekseyev, L.A. Gromova).²⁹
- Formation of the individual graphs of learning that allow the teacher to analyze the route of education, to identify complex issues, problems in the declarative, procedural and strategic knowledge.
- Feedback. Freedom and an active position in students' question-making to the teacher, such as: Why? Could you show/prove/explain?
- Consideration of the previous experience, monitoring the entry-level of knowledge and skills, priorities and interests of students.
- Monitoring learning difficulties, their typology and correction based on the identified problem, typology of thinking and perception of students.
- Personalization of learning processes by choosing (congruence) communication styles of educational dialogue subjects.
- The adequacy of the reporting method and format, based on the student's individual and psychological characteristics. For example, the suppression of redundant parts or, conversely, more detailed focusing on a certain perceptual channel preferred by a learner, etc.
- Adaptability of a dialogue form of multimedia-environment (customization).
- Personification of interactive communication (if necessary – the introduction of intelligent computer agents).
- Support by the identified types of learner motivation.
- The problem of the visual image of the educational information and compliance with its internal characteristics of visual perception. Visual interface should give students and teachers a choice of information representation (visualization) methods:
- To activate abilities of students to give an integrated, holistic evaluation of many parameters of the problem;
- To select the appropriate way to represent data by the user.
- Problems connected with the use of hypertext. Notwithstanding the free establishment of relations between various concepts, texts in accordance with the associative way of thinking, interests and level of knowledge, the sequence of studying there is a risk of loss of orientation in the material under study in the user's sequence necessary for him/her. Perhaps, there is a need in tips like: "You have strayed from the subject" for some restrictions of unnecessary freedom.
- The problem of psycho-physiological test (survey) in certain program bridges (environment). How can one make testing an "unboring" process including 1000 questions and at the same time optimally reliably determining the current status of the student?
- The problem connected with the complexity of developing a universal program environment for a variety of subject areas because of different content of knowledge structures.

The above mentioned principles give rise to a number of problems of educational multimedia, which might include:

- Problems of the touch interface (coordination of sensory parameters of the person and multimedia-systems, harmonization of psychophysical, psycho-physiological and neuro-physiological regularities of perception process, understanding, feedback, etc. of the student and computer programs).

Summarizing the research in the field of educational multimedia³⁰⁻³⁴, we will present the integration of didactic requirements of modern multimedia-environment for the teaching system. Among them are:

- Availability,
- Adaptability,
- Visualization of educational information,
- Completeness,
- Structuredness,
- Modern design,
- Multiple-level system,
- Controllability,
- Scientific character of content,
- Interactivity,
- Creativity,
- Modelity.

We would like to emphasize that the main feature of modern multimedia should be multi-functionality. We

consider the media as a means of education, educational interactive learning environment, a powerful educational hypertext resource and communication environment of subjects of study (Figure 9).

In contrast to the formal, generic approach, where skills and knowledge are predetermined, with a different approach when the informational culture includes the implementation of diverse and therefore generalized skills and knowledge, the learning process becomes developing and emerging for a future teacher. Multimedia educational environment leads to radical changes of outdated narrow and fragmented knowledge to their generalization that as a result allows developing students' informational culture oriented at the world standard in education.

In any substantive work the process of interaction between the teacher and students is very important while introducing students to the nature and dynamics of the central concepts of an object or phenomenon. At the same time the teacher who owns the information and communicative competences can use them in many areas and be able to show them to a large extent in various activities. In addition, multimedia environment allows creating a virtual reality to simulate various situations which that are not implemented in practice for one or another reason.

3. Results

The study showed that to improve the effectiveness of education in educational media it is necessary to take into account and to adapt to differences in learning styles, beliefs, preferences and behavioral characteristics. Monitoring of individual learning style and relevant adaptation multimedia-program to it should contribute to the development of students' informational culture.

It should be noted that the integrated use of informational technologies has great didactic potential

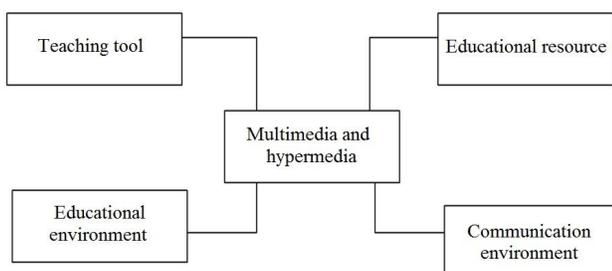


Figure 9. Functions of educational multimedia and hypermedia.

opportunities in terms of formation of students' informational culture.

As we pointed out earlier, it is possible to consider the ethical and legal aspects of using informational technologies. Compliance with ethical standards and rules substantially depends on the personality; legal and administrative laws have mandatory nature; their violation entails legal liability. The analysis of the literature on this issue shows that the legal consciousness in general and especially in the field of computer science is currently at a low level; many of the involved issues have not obvious answers and solutions.

In the Republic of Kazakhstan the regulation of the field related to computer science is a new area of undeveloped direction. In 1992, the Law of the Russian Federation "On Legal Protection of Software and Databases" was adopted; the content of this Act provides the definition of concepts related to the authorship, legal protection of programs and so on. In 1995, the law "On Information, Informatization and Information Protection" was passed, which is the basic legal document facilitating the adoption of additional legal acts for the information society development.

The current law defines the state policy goals in the field of informatization.

Computerization stands out as an important new strategic direction of the state activity. Laws create the conditions for inclusion Kazakhstan into the international information exchange, provide informational security and the rights of individuals and legal entities in the information sphere.

We will not consider all the subtleties of the law dimensions, but we point out the main actions that can be treated as computer crime, which entail punishment. In world practice, the main types of computer crimes, as well as methods of dealing with them were identified. They can be divided into two broad categories: Related with computer work interference; unauthorized access to computer systems, which are characterized by the development and dissemination of computer viruses; support for computer information, stealing of computer information; using computers as a necessary technical means in order to create counterfeit products.

It is obvious that the basic knowledge of the legal aspects, not only helps increase the level of students' informational culture, but the whole culture at large determines the quality of their life in a rapidly changing society.

We will dwell on the ethical aspects of computer science, which is also an integral part of the informational culture. The problem of ethics was studied by many scientists³⁵⁻⁴⁰. The system of moral behavior of a person is usually understood as the norms of ethics. Ethics (lat. ethica – custom, character) is a philosophical science about morality, which contains two major moral categories – good and evil. Observance of the moral requirements, their support by a person is usually associated with good according to⁴¹ and violation of moral norms and rules is a moral evil. Understanding of this matter encourages a person to behave in accordance with the moral demands of society to improve his/her behavior and his/her moral development.

4. Discussion

At present there is growing tendency in society to bring the ethical evaluation criterion into a variety of industry activities. According to the classical approach ethics is considered in the activity as something external to its content, its results are subjected to ethical evaluation, i.e., its own product and its value to society are more important than the activity itself. In this case, one is guided by universal norms and standards and by the values that society accepts and proclaims as the basic ones. Every sphere of human activity can function effectively only in case of the appropriate ethical regulations, therefore there is no coincidence in the emergence of certain ethical codes. The ethical dimension of personal informational culture is studied in^{16,42,43} and others. They point out that “in computer science we now have certain moral and ethical standards of behavior and activity”¹⁶ as in other spheres of human activity and they believe that the considered rules differ from the generally accepted ethic by a greater openness, altruism. This is proved by many factors, the main of them are:

- Willingness to help, to give advice or consultation;
- Willingness to give a computer to do the work;
- willingness to offer one's own software developments.

We considered positive aspects, but there are a number of negative elements that deserve special attention, among them are such as: Linguistic; activity in telecommunication networks; general ethical standards of moral behavior.

We will describe briefly the linguistic issues that are discussed by many scientists^{16,43,44}. The basic terminology

of informational technologies is formed by Russian neologisms that have emerged on the basis of English words and expressions.

Informational technologies is a part of human culture; in this regard, its basic elements are historically connected with the English-speaking countries, but they say it is not “justification of contamination” of the Russian language⁴³. It is obvious that the slogan of total Russification has no future, as in the process of the development of telecommunication tools there will inevitably be a need for international communication tools. Most likely, English terminology will be used and developed as well.

Unfortunately, it is in the field of informatics that Russian language is the subject of unimaginable transformation; scientists are currently conducting researches on this issue. According to¹⁶, it is almost impossible to understand Russian “information scientists”, whose slang is based upon distorted English terms and abbreviations under the Russian pronunciation influence and the set of slang words borrowed from Russian language on the basis of analogy and association by similarity and contiguity is formed as well.

In this regard, there is an urgent need for the formation of basic terminology for students in the process of development of informatics and, not only the specific vocabulary, knowledge of their meaning and pronunciation is by no means important, but also the absolute conviction in one of the ethical rules of the inadmissibility of the native language distortion, in particular, the Kazakh language.

The ethical problem arises when using telecommunications networks. Many aspects are regulated by legal laws, but, nevertheless, there are several aspects which are explained by the general system of moral behavior norms. In particular, in⁴⁵⁻⁴⁷ the problems of separating people into groups of “the rich” and “the poor” according to the available for them information are touched upon, the difficulties of the original preservation and the copyright, the emergence of a particular hierarchy of social relationships are considered.

In our view, both positive and negative moral and ethical norms were formed, thus, based on the peculiarities of the development of the information society in general, which are expressed in lagging behind the developed countries in the field of informational technologies, as well as insufficient number of highly qualified specialists in Kazakhstan. The latter problem is now successfully being solved in our country.

Consider the aspect of common ethical conventional morality of human behavior in the information society. In the field of computer science, it is necessary to clarify the existing guidelines, which, at first glance, are obvious: A decent person will not read the contents of a floppy disk forgotten by someone; he/she will not copy the program and will not use someone else's computer in the absence of the owner, he/she will not give commercial advertising at non-profit teleconferencing, he/she will not allow profanity or transparent euphemisms and so on. Designating ethical and legal issues of personal informational culture, it is important to note that they may be solved only together with the formation of students' personal and moral qualities, such as care, observation, optimism, patience, willpower, sociability, honesty, integrity, dignity, honesty, self-improvement, creative thinking and many others in the course of teaching computer science.

5. Conclusion

The analysis of the literature on this issue³⁵⁻⁴⁰ allows arguing that the basis of the student's personality should be the morality as both an internal and spiritual quality of the person's nature, his/her need to act in accordance with the requirements of ethics and morality, that is, the moral consciousness. It consists of three components: Moral knowledge, moral beliefs and moral necessity. Moral knowledge is a basic knowledge of ethics and morality, which includes the professional activities that the student receives in the course of teaching computer science. Moral persuasion is students' confidence in their actions based on experience and knowledge, which is a higher stage of development of a person and his/her consciousness, because they are based on a deep and comprehensive assessment by a person moral standards known to him/her, proven by practice and his/her internal approval. The moral requirement is the highest degree of person's moral consciousness. It is characterized by the presence of the moral requirements of compliance.

6. References

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