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**POTENTIALITIES OF COMPUTERIZED TEACHING TECHNOLOGY
AS PEDAGOGICAL CONDITIONS FOR INTENSIFICATION
OF AN EDUCATIONAL PROCESS IN THE HIGHER EDUCATION**

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Potentialities of Computerized Teaching Technology as Pedagogical Conditions for Intensification of an Educational Process in the Higher Education

The article is devoted to problem of intensification of an educational process in universities using computerized teaching technology. Computerized teaching technology is interpreted as an aggregate of technical means, methods, techniques of collection, organization, storage, processing, transmission and presentation of information necessary for teaching activity, learning activity and management of education.

The author affirms that potentialities of computerized teaching technology are kind of pedagogical conditions for an intensification of a learning process in higher education. Such pedagogical conditions in combination with other factors form an educational environment.

According to findings of previous studies, the intensification of the educational process in universities assumes an assimilation and formation of more knowledge, skills and competences. To maintain such intensification, the autor suggests aiming teachers` efforts at two goals. First, complication, activation, organization of explicit cognitive activities of students. Secondly, support, facilitation, relief, stimulation of implicit mental processes during the corresponding learning activities.

Optimal means for achieving both goals is computerized teaching technology. Their potentialities that complicate the learning and cognitive activities are: a hypertextuality of educational content; an interactivity; a detailed, large-scale and automated feedback that aimed at teacher; an increase of training`s intellectuality. The potentialities of the computerized teaching technology that provide mental support for students are: multimedia, telescopicity, comfort etc.

Key words: intensification of educational process in higher education, educational information technologies, pedagogical conditions, complication of educational and cognitive activity, facilitation of mental processes.

Formation of the information civilization causes dynamic changes in all spheres of public life, including in the field of education, despite a certain conservatism of its subjects and inertia of its management institutions. A geometric

growth of information needed by a modern professional requires from higher education to constantly adjust a structure and content of vocational training, and focus on unused reserves, in particular, on means and methods of intensifying the educational process and computerized teaching technology.

An importance of educational informatization cannot be overestimated. In particular, American educator K. Kerr calls it the fourth "revolution in the field of teaching methods." The first, in his opinion, was a replacement of teacher parents by professional teachers; the second – in a replacement of a spoken word with writing; the third – in an introduction of printed text [cit. on: 1, p. 236].

Understanding the importance of the problem of the informatization of education has caused numerous scientific studies in recent years. In the works of B. Hershunskyi, R. Hurevych, M. Zhaldak, Yu. Mashbyts, I. Robert and others, directions and ways of informatization of education have been determined. The theoretical basis and methodology of IT using in an educational process was characterized by N. Anisimova, N. Apatova, V. Bykov, I. Zakharova, I. Ibrahimov, O. Meniailenko, O. Sokoliuk and others. Tools and technologies for development of educational software suggested O. Bashmakov, V. Hura, S. Semerikov and others. Theoretical bases and practical features of the introduction of distance and blended learning characterized by K. Buhaichuk, O. Kukharenko, M. Moisieieva, Ye. Polat and others. Psychological and pedagogical aspects of the use of computerized teaching technology investigate, in particular, by Yu. Zhuk, P. Obraztsov, V. Marihodov, Z. Seidametova, A. Undorezova. The problems of using IT in higher education in the Ukraine analyzed by O. Balalaieva, L. Hryzun, V. Krasnopolskyi, D. Taushan, S. Fedorova and others.

At the same time, psychological and pedagogical basics of the intensification of the educational process were established in some classical works of S. Arkhanhelskyi, Yu. Babanskyi, V. Bespalko, M. Danylov, I. Lerner, M. Skatkin, N. Talyzina. Separate problems of the intensification of the educational process in modern universities characterized by L. Bilousova, N. Zhytienova, O. Kyselova, H. Lebed, I. Lutsyk, O. Pshenychna and others.

Based on the conclusions of some relevant studies, we emphasize an unsolved part of the problem: justification of potential properties of computerized teaching technology as the pedagogical conditions for the intensification of education in higher education. To achieve this goal, we consider it necessary to solve three following tasks:

1. To find theoretical constructs that make it possible to compare the concept of "computerized teaching technology" and concept of "pedagogical conditions".
2. To characterize the essence of the intensification of the learning process and its tasks in higher education.
3. To determine the potentialities of computerized teaching technology that contribute to the intensification of the educational process in higher education

The term "educational information technologies" used in our study is the most common analogue of the English-speaking term "computerized teaching technology" in post-Soviet pedagogy [2, p. 67]. The generic term "information technologies" is a complex of methods and technical means for collecting, organizing, storing, processing, transmitting and presenting information, expanding people's knowledge and developing their capabilities to manage technical and social processes [3]. At the same time, "computer technologies" are considered either as part of information technologies [4, p. 6], or as an outdated term, is replaced by the concept "information technologies" [2, p. 67]. M. Zhaldak understand some similar concepts are "infocommunication technologies", "information and communication technologies" as "a combination of methods, tools and techniques of labor used to collect, organize, store, process, transmit, present various messages and data" [5]. Despite the importance of communication component of the information technologies and pedagogical process, we do not see a fundamental disagreement in the concepts of ICT and IT, and therefore we use the latter. In addition, this abbreviation is provided the International Classification of Standards (ICS) and the Ukrainian Classifier of Regulatory Documents [6].

Nowadays, although most authors define educational IT define in terms of "tools", "methods", "techniques", "forms", "processes". However, the term

"technology" in the phrase "educational IT" is by far the broader than term "tools" ("learning tools"). The scope of the term "educational IT" includes not only software, hardware, but also acts, processes, methods, forms, techniques of working with information tools for pedagogical purposes. Therefore, we approve an inclusion of the term "environment" in this categorical scope. In particular, V. Melamud recognizes educational IT as a substantively and communicatively directed learning *environment*, attracts students in educational and cognitive activities [7] (here and further our italics – RV).

In turn, the learning *environment* is understood, in particular, as a complex of pedagogical conditions and tools [8]. Thus, the interpretation of educational IT as a component of the learning environment allows us to find a common denominator between the concepts of "educational IT" and "pedagogical conditions." This seems important, given a multiplicity of using the concept of "pedagogical conditions" in a formulation of pedagogical dissertations hypotheses.

N. Borytko provides a detailed analysis of the concept of "pedagogical conditions" and related concepts. He resembles the meaning of the term "condition": a circumstance on which anything depends; the situation in which something occurs. This scholar delineates the meaning of related concepts: "in contrast to a *cause*", directly generates a particular phenomenon or process, *conditions* form an *environment*, in which the latter arise, exist and develop" [8, p. 113]. In contrast to a *factor*", a condition can not only be predicted, but also constructed. In contrast to *tools*", a constructed condition does not rigidly determine an achievement of a certain result [8, p. 114]. Agreeing with this, we conclude that the potentialities of educational IT are the components of the educational environment, specifically constructed to achieve pedagogical goals, in particular, the intensification of the learning process.

It is worthwhile to emphasize that the term "educational IT" is used in the plural, which causes the issue of how to name a separate element of these technologies, for example, a specific distance course, an electronic textbook, a

specialized site or a social network. In this case, we consider it expedient to use the normatively defined concept of EER– "electronic educational resource" [9].

The second task of our study is to determine the essence of the intensification of learning. The term "intensive", in contrast to the term "extensive", means increased efficiency, productivity, and tenseness [10, p. 502] of a social process not at the expense of *quantitative* increase of resources (in agriculture – space, in education – time), but due to a *qualitative* improvement of tools, methods, operations, technologies.

It should be noted, that the tasks of increasing productivity are put forward to many social processes, so a requirement of the intensification of learning fully corresponds to current trends in the development of postindustrial society. The shortest definition suggests H. Lebed: "Intensification of learning is a transfer of more educational information to students with the same length of training and without reducing the requirements for the quality of knowledge" [11].

The researchers define the intensification of the learning process in higher education as "improving the productivity of reciprocal activities of students and teachers, which provides for the qualitative vocational training within the time frame defined by the curriculum" [12]. O. Kyselova suggest certain decomposition of the phenomenon under investigation. She said: "the intensity of the pedagogical process can be defined as the more complete and rational use of *technical* (learning tools), *material* (means) and *labor* (scientific and pedagogical staff) resources, using effective "means of production" (teaching methods) and the achievement of scientific and technological progress" [13].

The aforementioned and italicized aspects of the problem of intensification of learning are studied by different scientific schools. In particular, O. Pshenychna defines the *didactic direction* of research and psychological direction, which "is based on the peculiarities of activating mechanisms of perception, thinking, understanding, cognitive activity" [12].

The formation of these scientific approach is not accidental, since it is logical to search a means of complicating educational and cognitive activity, as well as

methods of mental support of students in the conditions of intensive educational and cognitive activity.

In this regard, an analysis of the relevant potentialities of educational IT we start with their differentiation into two groups. The criterion of this differentiation is the object of direct pedagogical influence of each property. Accordingly, we will highlight IT potentialities aimed at: 1) organization of educational and cognitive activities; 2) support of students` high working mental capacity in this activity. Our principled position is a delimitation of concepts and phenomena "activity" and "mental process". This distinction was made, in particular, by A. Brushlinsky on the example of activity of thinking and process of thinking. In his opinion, activity is always controlled, purposeful, stage, and mental processes proceed beyond the control of consciousness, non-disjunctive, syncretic [14].

Of course, the starting component of an activity is the needs of the subject of activity and his motivation. In addition, activities accompanied by cognitive, emotional, volitional processes. Therefore, any pedagogical condition that organizes learning and cognitive activity affects mental processes. But the immediate object of pedagogical influence will be either complication or support.

The essence of pedagogical influence on learning and cognitive activity is in its gradual complication – this is consistent with the concept of a step-by-step formation of mental actions of P. Galperin and N. Talyzina. And vice versa the pedagogical conditions for support of mental processes aimed at the constant maintenance, stimulation, facilitation, relief, which increases the student's potential and zone of immediate development. This approach corresponds to the concept of zones of actual and immediate development of L. Vygotsky and his followers. At the same time, the complication of learning and cognitive activity is an explicit process, and student support is implicit process.

To the potentialities of educational IT, which provide the organization of educational and cognitive activity, we refer to the above properties. 1. A hypertextuality of learning content – its non-linearity, availability of several trajectories of presentation and study. 2. An interactivity of educational IT – an

ability of the electronic educational resource to respond to the student's actions and adapt to his needs. 3. Provision of large-scale, detailed and automated feedback of the teacher. 4. Increase an intellectuality of the educational process, in particular due to: 4.1) a deliverance of teachers and students from routine reproductive actions and operations; 4.2) a suitability for an implementation of sophisticated learning and cognitive tasks; 4.3) using of global information resources; 4.4) improving the information competence of users; 4.5) support of relevance of learning content.

Consider the properties of educational IT, which contribute to mental support for student. *Multimedia* can be considered as a condition for facilitation of cognitive processes and stimulation of affective processes, as it actualizes positive emotional-motivational states. The second relevant property of educational IT we propose to call "*telescopicity*" (the term in a similar sense is used by A. Prokopenko [15]). The structuring of the educational content of educational IT is interactive, it involves easy and visualized operations of analysis, decomposition, information expansion and with it – synthesis, composition, information compression operations. To grasp the structure of learning content, it is necessary not only to perform a complete decomposition, but also to perform reverse integration of the disparate subcomponents into a single hierarchical structure. Thus, the telescopicity of learning content is oriented not only to the analytical function of cognitive processes (perception and thinking in the first place), but also to their ability to synthesize. So, the visualization of learning content takes into account S. Fedorova's "need for a cadet Gestalt" [16].

The next pedagogical condition for maintaining a high working capacity of the student psyche is a *friendliness* of educational IT – an ability to ensure the psychological comfort of students when working with them. A number of following characteristics provides this effect: 1) potential interest of the younger generation in computer technologies; 2) non-publicity of academic failures; 3) positive evaluation of academic success; 4) friendly and clear interface, providing functional assistance; 5) there are interesting, beautiful, aesthetic, even "catchy" component in the content of educational IT; 6) an ability to adapt the pace, time, place of concrete student.

Based on the foregoing, we can draw the following conclusions.

1. The scope of the concept of "educational IT" includes not only software, hardware, but also acts, processes, methods, forms, techniques of using information tools for pedagogical purposes. This conclusion allows to interpret the educational IT as "environment", a complex of tools, conditions, factors and causes.

2. Intensification of the educational process in higher education is based on increase of the educational content and a reduction in time for its assimilation and formation. Accordingly, the pedagogical conditions for the intensification of learning process should be aimed at organizing and complicating learning and cognitive activities and, at the same time, maintaining high mental performance in this activity.

3. The potentialities of educational IT that provide organization and activation of learning and cognitive activity, we include: interactivity (for students), automatic feedback (for educator), increasing the intellectuality of the educational process. To the properties of educational IT, which contribute to the maintenance of high mental capacity when working with them, include: multimedia, telescopicity, comfort of educational IT.

Further studies require: a research of an effectiveness of concrete electronic educational resource, a definition of universal criteria for their effectiveness, an establishment of specific features and didactic potential of educational IT implementation and a justifications of appropriate recommendations.

References

1. **Kotova I.B.**, Shiyarov Ye.N. Razvitiye lichnosti v obuchenii [Personality Development in Learning]. Moscow, *Akademiya*. 1999. 286 p. (rus)

2. **Obraztsov P.I.**, Kosukhin V.M. Didaktika vysshey voyennoy shkoly [Didactics of Higher Military School]. Orel, *Akad. Spetssvyazi Rossii*. 2004. 317 p. (rus)

3. **Iatsiuk S.M.** Dydaktychni umovy vykorystannia kompiuterno-orientovanykh zasobiv navchannia studentiv medyko-tekhnichnoho profilu : avtoref. dys. na zdobuttia nauk. stupenia kand. ped. nauk : 13.00.09. [Didactic terms

of the use of the computer-oriented facilities of teaching of students of medico-technical type. – The thesis is submitted for a candidate of pedagogical science degree in the speciality 13.00.09 – Training theory]. Lutsk, *Volynskyi Derzh. un-t im. Lesi Ukrainky*. 2005. 20 p. (ukr)

4. **Kompyuternye** tekhnologii v nauke i obrazovanii : metodicheskiye ukazaniya k prakticheskim zanyatiyam [Computer technologies in science and education: methodical instructions for practical studies]. Ulyanovsk, *Ul-GTU*. 2001. 42 p. (ukr)

5. **Zhaldak M.I.** Pedahohichniy potentsial komp`iuterno-oriientovanykh system navchannia [Pedagogical Potential of Computer-Oriented Learning Systems]. *Novi tekhnolohii navchannia*. 2004. Spetsvyp. Pp. 6-12. (ukr)

6. **Ukrainskyi** klasyfikator normatyvnykh dokumentiv DK 004:2008 [Ukrainian Classifier of Regulatory Documents]. Kyiv, *DCUPTR*. 2012. (ukr)

7. **Melamud V.E.** Osobennosti, nekotorye napravleniya i tendentsii primeneniya informatsionnykh tekhnology v sovremennom obrazovanii [Features, some directions and tendencies of information technologies using in modern education]. *Mir psikhologii*. 2006. No. 2 (38). Pp. 242-243. (rus)

8. **Borytko N.M.** V prostranstve vospitatelnoy deyatelnosti : monografiya [In space of educational activity : monograph]. Volgograd, *Peremena*. 2001. – 181 p. (rus)

9. **Polozhennia** pro elektronni osviti resursy [Statute of electronic educational resources]. Kyiv, *MON*. 2012. (ukr)

10. **Velykyi** tlumachnyi slovnyk suchasnoi ukrainskoi movy [Great explanatory dictionary of modern Ukrainian language]. Kuiv, *Perun*, 2005. 1728 p. (ukr)

11. **Lebed H.M.** Intensyfikatsiia navchalnoho protsesi yak neobkhidna umova rozvytku samoosvitnoi kompetentnosti maibutnikh fakhivtsiv tekhnichnoho profilu [Intensification of learning process as a necessary condition for the development of self-education competence of future technical specialists]. *Informatsiini tekhnolohii v osviti, nautsi ta vyrobnytstvi*. 2014. No. 4 (9). – Pp. 180-186. (ukr)

12. **Pshenychna O.S.** Intensyfikatsiia navchalnogo protsesu u vyshchii shkoli na osnovi vykorystannia informatsiinykh tekhnolohii [Intensification of learning process in the high school on basis of information technologies using]. *Pedahohika formuvannia tvorchoi osobystosti u vyshchii i zahalnoosvitnii shkolakh.* 2014. No. 36. Pp. 590-597. (ukr)

13. **Kyselova O.I.** Shliakhy i metody intensyfikatsii pedahohichnogo protsesu u vyshchii shkoli [Directions and methods of intensification a learning process in high school]. *Nauka i osvita.* 2011. No. 7. Pp. 45-49. (ukr)

14. **Brushlinsky A.V.** Subyekt: myshleniye, ucheniye, voobrazheniye: Izbrannye psikhologicheskiye trudy [Subject: thinking, learning, imagination : Selected psychological works]. Moscow, *Izdat. Moskovskogo psikhologo-sotsialnogo in-ta.* 2003. 408 p. (rus)

15. **Prokopenko A.I.** Informatsiina tekhnolohiia leksychnoi kvalimetrii dydaktychnykh zasobiv (na prykladi pidruchnykiv anhliiskoi movy) : avtoref. dys. na zdobuttia nauk. stupenia kand. ped. nauk : 13.00.04 [Information Technology of Didactic Means Lexical Qualimetry (based on the English language textbooks). The thesis is submitted for a candidate of pedagogical science degree in the speciality 13.00.04 – theory and methods of professional education] – Kyiv, *In-t pedagogiki i psikhologii prof. osviti APN Ukraïni,* 1999. – 18 p. (ukr)

16. **Fedorova S.O.** Efektyvnist kompiuternykh navchalnykh kursiv v protsesi pidhotovky kursantiv vyshchoho viiskovoho zakladu osvity : avtoref. dys. na zdobuttia nauk. stupenia kand. ped. nauk : 20.02.02 / p. O. Fedorova. – Khmelnytskyi : *Nats. Akad. Prykordonnykh viisk Ukrainy im. Bohdana Khmelnytskoho.* 2001. 20 p. (ukr)

Валеев Р.Г.

Можливості освітніх інформаційних технологій як педагогічні умови інтенсифікації навчального процесу у вищій школі

Стаття присвячена проблемі інтенсифікації навчального процесу у вишах з використанням освітніх інформаційних технологій. Освітні інформаційні технології розуміються автором як сукупність технічних засобів, методів, прийомів: збору, організації, зберігання, обробки, передачі та подання

інформації, необхідної для діяльності викладання, діяльності учіння та управління освітнім процесом.

Автор стверджує, що можливості освітніх інформаційних технологій є своєрідними педагогічними умовами інтенсифікації навчального процесу у вищій школі. Ці педагогічні умови у поєднанні з іншими чинниками утворюють освітнє середовище.

Згідно з результатами попередніх досліджень, інтенсифікація навчального процесу в вищій школі передбачає засвоєння та формування більшої кількості знань, навичок та компетенцій. Щоб підтримати таку інтенсифікацію, Валеев пропонує націлити зусилля вчителів на дві мети. По-перше, на ускладнення, активізацію, організацію експліцитної навчально-пізнавальної діяльності студентів. По-друге, на підтримку, полегшення, фасилітацію, стимуляцію імпліцитних психічних процесів, що супроводжують відповідну навчально-пізнавальну діяльність.

Оптимальним засобом досягнення обох цілей є освітні інформаційні технології. Їх можливості, які ускладнюють навчально-пізнавальну діяльність: гіпертекстуальність навчального контенту; інтерактивність; детальний, масштабний та автоматизований зворотний зв'язок, спрямований на вчителя; підвищення інтелектуальності навчання. Можливості освітніх інформаційних технологій, що забезпечують психічну підтримку студентів: мультимедіа, телескопічність, комфортність тощо.

Ключові слова: інтенсифікація навчального процесу у вищій школі, освітні інформаційні технології, педагогічні умови, ускладнення навчально-пізнавальної діяльності, фасилітація психічних процесів.

Валеев Р.Г.

Возможности образовательных информационных технологий как педагогические условия интенсификации учебного процесса в высшей школе

Статья посвящена проблеме интенсификации учебного процесса в вузах с использованием образовательных информационных технологий. Образовательные информационные технологии понимаются автором как совокупность технических средств, методов, приемов: сбора, организации, хранения, обработки, передачи и представления информации, необходимой для деятельности преподавания, деятельности учения и управления образовательным процессом.

Автор утверждает, что возможности образовательных информационных технологий являются своеобразными педагогическими условиями интенсификации учебного процесса в высшей школе. Эти педагогические условия в сочетании с другими факторами образуют образовательную среду.

Согласно результатам предыдущих исследований, интенсификация учебного процесса в высшей школе предполагает усвоение и формирование большего количества знаний, навыков и компетенций. Чтобы поддержать соответствующую интенсификацию, автор предлагает нацелить усилия педагогов на две цели. Во-первых, на осложнение, активизацию, организацию эксплицитной учебно-познавательной деятельности студентов. Во-вторых, на

поддержку, облегчение, фасилитацию, стимуляцию имплицитных психических процессов, сопровождающих соответствующую учебно-познавательную деятельность.

Оптимальным средством достижения обеих целей являются образовательные информационные технологии. Их возможности, которые затрудняют учебно-познавательную деятельность: гипертекстуальность учебного контента; интерактивность; детальная, масштабная и автоматизированная обратная связь, направленная на педагога; повышение интеллектуальности обучения. Возможности образовательных информационных технологий, обеспечивающих психическую поддержку студентов: мультимедиа, телескопичность, комфортность и т.п.

Ключевые слова: интенсификация учебного процесса в высшей школе, образовательные информационные технологии, педагогические условия, усложнение учебно-познавательной деятельности, фасилитация психических процессов.

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