

Artículo de investigación

Interaction of Productive and Interactive Technologies in the Educational Process of Higher School

Взаимодействие Продуктивных и Интерактивных Технологий в Образовательном Процессе Высшей Школы

Interacción de tecnologías productivas e interactivas en el proceso educativo de la escuela Superior

Recibido: 29 de abril de 2019. Aceptado: 8 de junio de 2019

Written by:

E. Kovshar⁷⁶

ORCID ID: 0000-003-3407-8570

I. Palshkova⁷⁷

ORCID ID: 0000-0002-6710-5232

L. Savchenko⁷⁸

ORCID ID: 0000-0002-4246-3228

Abstract

The article identifies productive technology as a set of interactive learning tools, which allows students and teachers to create personal educational products of intellectual discovery: project, invention, design, presentation, task, hypothesis, etc. Productive activity is a personality trait manifesting itself in its relation to cognitive activity, which presupposes the state of readiness and desire for independence. It is aimed at the assimilation of social experience, human knowledge, and implementation of techniques related to educational and professional activities. The interaction of productive interactive technologies is a set of software, technical, computer, and communication equipment, as well as ways and innovative methods of their application, aimed to ensure high efficiency and informatization of the educational process. Multimedia is the latest computer technologies and techniques including animated graphics, video, sound, interactive features, as well as the use of remote access, external resources, and databases. A quantitative, qualitative, and statistical analysis, conducted upon the completion of the experimental work, has demonstrated positive changes in the productive cognitive activity of students in the experimental group.

Аннотация

в статье технология продуктивности определяется как набор интерактивных инструментов обучения, позволяющих учащимся и учителям создавать персональные образовательные продукты: проект, изобретение, дизайн, презентация, задание, гипотеза и т.д. Продуктивная деятельность - это личностная черта, проявляющаяся в ее отношении к познавательной деятельности, что предполагает готовность и стремление к независимости. Она направлена на усвоение социального опыта, человеческих знаний и внедрение методов, связанных с образовательной и профессиональной деятельностью. Взаимодействие продуктивных и интерактивных технологий представляет собой совокупность программного, технического, компьютерного и коммуникационного оборудования, а также способов и инновационных методов их применения, направленных на обеспечение высокой эффективности и информатизации образовательного процесса. Мультимедиа - это новейшие компьютерные технологии и технологии, включающие анимационную графику, видео, звук, интерактивные функции, а также использование удаленного доступа, внешних ресурсов и баз данных.

⁷⁶ Kryvyi Rih State Pedagogical University, Gagarina Avenue, 54, Kryvyi Rih, Ukraine

https://elibrary.ru/author_items.asp?authorid=1032748&pubrole=100&show_refs=1&show_option=0

⁷⁷ South Ukrainian National Pedagogical University named after K.D. Ushynsky, Staroportofrankivska Street, 26, Odessa, Ukraine

https://elibrary.ru/author_items.asp?authorid=1032753&pubrole=100&show_refs=1&show_option=0

⁷⁸ Kryvyi Rih State Pedagogical University, Gagarina Avenue, 54, Kryvyi Rih, Ukraine

https://elibrary.ru/author_items.asp?authorid=1032749&pubrole=100&show_refs=1&show_option=0

Keywords: interaction, productive technologies, interactive technologies, multimedia technologies.

Количественный, качественный и статистический анализ, проведенный по завершении экспериментальной работы, продемонстрировал положительные изменения в продуктивной познавательной деятельности учащихся экспериментальной группы.

Ключевые слова: взаимодействие, продуктивные технологии, интерактивные технологии, мультимедийные технологии.

Resumen

El artículo identifica la tecnología productiva como un conjunto de herramientas de aprendizaje interactivo, que permite a los estudiantes y profesores crear productos educativos personales de descubrimiento intelectual: proyecto, invención, diseño, presentación, tarea, hipótesis, etc. La actividad productiva es un rasgo de personalidad que se manifiesta en su relación con la actividad cognitiva, que presupone el estado de preparación y el deseo de independencia. Está dirigido a la asimilación de la experiencia social, el conocimiento humano y la implementación de técnicas relacionadas con actividades educativas y profesionales. La interacción de tecnologías interactivas productivas es un conjunto de software, equipo técnico, informático y de comunicación, así como formas y métodos innovadores de su aplicación, destinados a garantizar una alta eficiencia e informatización del proceso educativo. Multimedia es lo último en tecnologías y técnicas informáticas, que incluyen gráficos animados, video, sonido, funciones interactivas, así como el uso de acceso remoto, recursos externos y bases de datos. Un análisis cuantitativo, cualitativo y estadístico, realizado al finalizar el trabajo experimental, ha demostrado cambios positivos en la actividad cognitiva productiva de los estudiantes en el grupo experimental.

Palabras clave: interacción, tecnologías productivas, tecnologías interactivas, tecnologías multimedia.

Introduction

The development of education is associated with the necessity to introduce new forms and methods of training using innovative technologies. Modern education is focused on the implementation and interaction of new productive interactive technologies. The following factors influence the level of students' preparation: the level and quality of the higher education preparation of students; the quality of educational standards and educational management; curriculum and programs; the quality of the educational process and scientific-methodological support; physical infrastructure, moral and psychological climate, pedagogical competence and skills of the teaching staff.

The research interest in the topic under study is caused by the contradiction between the high demand for the formation and development of the interaction of productive interactive technologies and the insufficient development of the issue at present.

Traditional education undergoes changes at all stages of the educational process. Theoretical and practical studies concerning productive division

based on the use of introspective technologies in pedagogical universities allow us to conclude that there are significant complications in the field of higher pedagogical education.

Therefore, it is important to perform a number of tasks in order to form educational content, which includes: harmonization of relevant disciplines and allocation of time considering their importance in the training of future technology teachers and the variety of curricula; transition to individual educational forms and technologies with an extensive use of the interactive technology. Students of higher education institutions should be able to use a wide range of means of communication for processing and preservation of information including personal computers, the Internet, cable and satellite television, mobile phones, Skype.

Literature Review

The analysis of Ukrainian psychological and pedagogical literature and recent dissertations demonstrates the constant attention of researchers to the introduction of new

information technologies in education. Scholars have created a common methodology for research related to the development and use of computer technology. Among them, one can name N. Atapova, A. Verlan, N. Golovan, A. Gurzhiy, Yu. Doroshenko, N. Zhaldak, etc. who studied this issue. G.H. Mead considered interaction as cooperation between people, during which they observe and comprehend the intentions of each other (Mead, 1967). G.C. Homans studied interaction as a theory of exchange: in the process of interaction, partners exchange two variables – the cost of interaction and the reward of cooperation. E. Hoffman considered interaction as a theory of impression management (theory of social drama).

The purpose of the article is to explore the efficiency of productive technologies, which are understood as a set of interactive learning tools, by using which students and teachers create personal educational products of intellectual discovery: project, invention, designs, presentation, task, hypothesis, etc. The interaction of productive interactive technologies is a set of software, technical, computer, and communication tools, as well as innovative methods, ensuring high efficiency and informativeness of the educational process.

The tasks of the research include the following: 1) to define the concepts of “interaction”, “productive technology”, and “productive education” in scientific literature; 2) to study the implementation of the method of situational analysis (case-method) in the educational process of pedagogical universities in the study of humanitarian disciplines; 3) to study the effectiveness of the introduction of the special course “Interactive Technologies in Higher Pedagogical School” with the implementation of educational projects; 4) to analyze the obtained results of using productive interactive technologies.

Methods

The following theoretical methods were used to solve the research tasks: retrospective and comparative analysis of psychological and pedagogical literature, generalization and classification of scientific data of philosophical, psychological, pedagogical, educational, and methodological sources for the purpose of determining the status and theoretical substantiation of the key concepts and categories concerning the preparation of respondents to introduction of productive teaching technologies. Moreover, diagnostic empirical methods

involving questionnaires, surveys, and tests based on certain criteria were applied in order to study the quality of received educational services.

A survey was conducted in educational institutions, which involved 32 students. The purpose of the survey was to test the effectiveness of multimedia presentations among students and to study the quality of education. The questionnaire developed by us contained questions concerning systematic control, independence of tasks performance, and methodological complexes for both students and teachers.

Results

Interaction (lat. inter + activus) is direct interpersonal communication, the most important feature of which is the recognition of a person's ability “to take on the role of the other” (Prokhorov, 1991).

The concept of interaction was formulated by the American philosopher and sociologist G.H. Mead, who argued the idea that human behavior is a passive response to reward or punishment (Liaudis, 1980).

The subject-subject type of interaction in the educational process can be called interactive. The interactive process is characterized by high intensity of communication, change of various activities, procedurality (change in the states of the participants), purposeful reflection by the participants of the activity, and constant connection with life (Kovshar, 2017).

Productive education provides an update of learning content with a focus on the “key competencies”, the mastery of which allows students to solve various problems of their social and professional formation. Productive education also provides for the acquisition of knowledge and skills, the learning of which forms the foundation of further professional growth of students. “Productive” is understood as required, efficient, durable, current, and generated at an appropriate level of knowledge and skills (Bloom, 1971).

Productive learning requires presentation of the results of each group member, as well as the formation of discussion skills so that personal experiences, opinions, and activities can be presented, critically analyzed, and adjusted becoming useful to others. Interactive technologies contribute to productive learning

providing the constant active interaction of all participants of the educational process. It is a close interaction in a student group, a team.

Regardless of the wishes of people, electronic means of communication, as well as digital and computer technologies have become an organic part of their everyday life. The popularity of modern multimedia technologies in education is natural and indisputable. Multimedia includes the latest computer technologies and techniques, among which one can name animated graphics, video, sound, interactive features, as well as the use of remote access, external resources, and databases. The multimedia means of learning are universal because they are used at different stages of the lesson: during motivation as a way to state the problem before examining new material; in the process of explaining new material as an illustration; during the consolidation and synthesis of knowledge as a way to evaluate educational achievements. New information technologies of training are a powerful and versatile means of obtaining, processing, storing, transporting, and presenting diverse information. They are especially useful in terms of operations related to monitoring and evaluation, opening wide possibilities for the analysis of the educational success of students.

As the media technologies are complex, their individual elements are often called by independent terms, in which the word "media" is transformed into "multimedia": multimedia processes, multimedia system, multimedia program, multimedia product, multimedia services, etc.

At the present stage of the development of pedagogical science and practice, the role of multimedia technology in teaching primarily consists in the expansion of the perception of learning tools. The emergence of new technical means of learning is observed, which in the educational process requires the use of hardware and software that implement multimedia technology. Students should form multimedia competency throughout the years of studying at high school. Media competence is an integral characteristic of the student, reflecting the level of knowledge, skills, and experience sufficient to achieve goals in information and communication activities. The criterion of multimedia competence is the value of the results of the student's work, its priority in a particular field of knowledge (Kulinka et al., 2014).

In our work, we used the analysis of a situation (case method). Studying humanitarian

disciplines, students learn the content of concepts, analyzing situations from their own lives: legal, historical, moral, etc., in which different interests, life views, and positions meet. Students can analyze such situations individually, in pairs, in groups. Such an analysis requires a specific approach and algorithm. Technology teaches students to raise questions, distinguish facts from opinions, identify major and minor circumstances, as well as analyze and make decisions (Sheremeta & Kanishchenko, 1999).

For example, Situation 1: "There is a conflict between two fellow-educators that prevents them from working successfully. Each of them individually has appealed to the administration with the request to understand and support their position". The task is to select and justify appropriate behavior in this situation:

- a. to stop conflict at work and to recommend resolving the conflict outside of the workplace;
- b. to ask the director and the deputy directors of the school to understand the conflict;
- c. to try to figure out the motives of the conflict personally and to find an acceptable option for the reconciliation between the parties;
- d. to find out which member of the staff is the authority for the conflicting parties, to try to affect these people.

Situation 2: "The colleague ignores your advice and guidance, makes everything in their own way, not paying attention to the comments you have made". The task is to explain what one needs to do with this colleague in the future:

- a. to investigate their motives and apply the usual administrative penalties;
- b. to try to speak frankly for the sake of the common goal and to find a common language with the colleague, set up a business relationship;
- c. to contact the team with a request to pay attention to the wrong behavior of the colleague and to take measures related to public influence;
- d. to try to understand whether you make mistakes in the relationship with this colleague and figure out what to do.

Situation 3: "Once you have been a member of the discussion of a few leaders about how to behave yourself better with colleagues. One of the items you like more". The task is to explain which and why:

- a. "If you want the teacher to work well, you need to ask them individually, consider their personality and pedagogical advantages";
- b. "Everything doesn't matter. The most important in the assessment of people is business qualities, diligence. Everyone should do what belongs to him";
- c. "I believe that the success in leadership can only be achieved if subordinates trust their supervisor, respect him";
- d. "That's right, but still the best incentives to work are strict orders, decent salary".

The analysis of the educational-professional preparation programs for specialists of the pedagogical profile has shown the need for students to study such topics in the framework of the humanitarian disciplines as "The introduction of media in the educational process", "Types of media", "New media. Digital, computer, information, network, and communication technologies", "Media literacy as the ability to analyze media information", "Periodical printed media. Radio as a source of mass information", "TV as a source of audiovisual information", "Perception of static visual information sources and media", "Contemporary media arts", "Creation of artistic image of Ukraine by means of mass media", "University websites" (Savchenko, 2012).

At the seminars, students consolidate the knowledge obtained at the lectures by forming their abilities and skills of computer design and modeling. They work on such objects as a blog or a group of their faculty/department/specialty/academic group in a social network, the first page or the cover of the student magazine of their specialty, radio appeal (advertising, weather report, news, greetings, etc.) for the faculty, a video "My favorite faculty", a photoset "Department of my dreams", comic book "Student life", an advertisement "My specialty", the project "Creation of artistic image by means of mass media", website of the faculty/department/specialty/academic group.

During the lectures and practical classes, we used the following means of methodological support: reference lecture notes (written and electronic); methodological recommendations to conducting the seminars; an interactive system of training and methodological support; visual materials on paper and electronic media, the Internet.

At the end of the course "Interactive Technology in the Higher Pedagogical School" students performed a practice project. Each student,

having selected an optional subject from any of the modules, was suggested to work on the theoretical material to carry out the practical application of projects, with which specialists of the chosen specialty work. The practice project was to be presented in the form of a model, created in a computer program.

The analysis of the websites of universities is one of the practical tasks of this course. The official websites of five higher education institutions of Ukraine, included in the "Top 200 Ukraine" rating prepared by the Centre of International Projects "Euro Education", were involved in the comparative analysis. They include Kyiv National University named after Taras Shevchenko, National Technical University of Ukraine "Kyiv Polytechnic Institute", Kharkiv National University named after V.N. Karazin, National Technical University "Kharkiv Polytechnic Institute", and National University "Kyiv-Mohyla Academy". Their high rating is motivated, in particular, by the successful organization of innovative and scientific activities, functioning of research institutes, centers, laboratories, etc. Having analyzed these pages, students created a website for their faculty.

During the lessons of the proposed course, multimedia technologies were used at all necessary levels of academic content in the formation of professional knowledge, perception, and observation.

One of the types of multimedia technologies is a multimedia long read. The layout of the multimedia long was developed based on the following algorithm: 1) long read is concerned with content, story, hero; 2) the theme of long read is a story – fully completed or completed to a certain extent; 3) superficial materials or just nicely laid out pictures don't make a story; 4) imagination is of great importance; 5) long read must be visually appealing: the style and layout are crucial; 6) long read can be linear (marks of history, and then reading the text in order) and cross-reading materials (headers, cuttings, blocks).

A multimedia long read "The History of Dress" was created for the discipline "Design of Clothes". The evolution of the dress and the history of wedding, cocktail, evening, prom and ball dress was introduced in the material. The long read was filled with photos, reproductions, paintings, and video content that supplemented the text for a better understanding of the presented topic (Savchenko et al., 2018).

Results Analysis

Upon conducting the experiment, we diagnosed the level of the respondents' readiness to use multimedia tools in educational activities based on specific criteria. The analysis of the obtained results shows that the quantitative indicators of the criteria in the experimental group (EG) significantly increased. However, in the control group (CG), the changes were insignificant. The motivation of the respondents to use multimedia

technologies in educational activities increased by 28.1% in the EG and by 5.6% in the CG. The level of common information literacy increased by 30% in the EG and by 3.1% in the CG. The level of multimedia-creative literacy increased by 30.6% in the EG and by 2.6% in the CG. The level of the respondents' readiness to apply multimedia technologies in educational activities before and after the experiment is presented in Table 1.

Table 1. The readiness of the students in the EG and CG before and after the experiment

Level	EG		CG	
	Before (%)	After (%)	Before (%)	After (%)
High	10.2	34.8	11.3	12.5
Medium	34.4	51.6	35	37.5
Low	55.4	13.6	53.7	50

The results concerning the readiness to use multimedia technologies are featured in Figures 1 and 2.

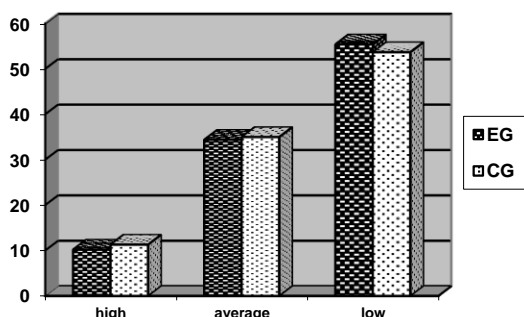


Figure 1. The readiness of the students in the EG and CG to use multimedia technologies before the experiment.

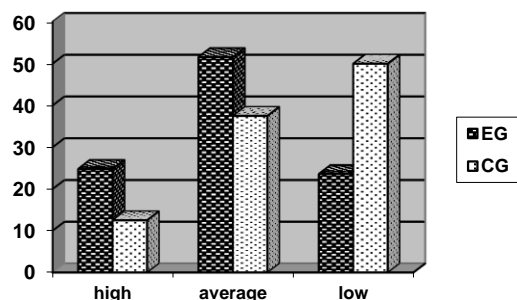


Figure 2. The readiness of the students of the EG and CG to use multimedia technologies after the experiment.

The analysis of the experiment results allows us to note the improved results of the respondents' acquisition of the educational material, developed using multimedia technologies. We observed an increase in the level of the students' readiness to use computer resources in educational activities: the number of the students with a high level of readiness increased by 14.6% and the number of the students with a medium level of readiness by – 17.2%. The participants formed and perfected their abilities to create their own multimedia presentation of educational material and skills of independent work with the media. They learnt to use information in electronic form and to organize their study time when working with a multimedia product. Moreover, they acquired the ability to use technologies in self-learning activities, to develop lessons for the teaching practice on the 4th and 5th years of their study using multimedia elements. The students mastered the stages of multimedia visualization. This contributed to the development of artistic and creative features of the future teachers – self-knowledge, creativity, and imagination. At present, these qualities are in high demand.

Conclusion

The analysis of the results of several studies on the impact of visibility on the speed of perception of information allows us to outline the benefits of multimedia learning based on auditory and visual

perception of information. It ensures affordable, fast and effective learning using the multi-channel presentation of information. The productive technology training is a process aimed at achieving success in activities focused on production and reflection of activity in the group of students with the support of teachers in a real-life situation. Under the interaction of productive interactive learning technologies, we understand a set of program, technical, computer, and communication tools, as well as ways and innovative methods of their application to ensure high efficiency and informatization of the educational process. The following projects were implemented using the developed special course: video clip "My favorite faculty", photoset "Faculty of my dreams", comic book "Student life", advertisement "My specialty", project "Creation of the artistic image of Ukraine by means of mass media", web-page of the faculty/department/specialty/academic group, analysis of the image of the university websites according to the rating "Top 200 Ukraine".

Thus, productive interactive technologies increase the intensity and efficiency of the learning process and create conditions for self-education optimizing the transition to continuing education. In conjunction with telecommunication technologies, they solve the problem of access to new sources of content and form of information presentation. We see further work in the development of the tasks for the productive technology.

References

- Bloom, B.S., Madaus, G.F., & Hasting, J.T. (1971). *Handbook on Formative and Summative Evaluation of Student Learning*. New York: McGraw-Hill.
- Implementation of "Education and Training 2010" work Programme.
- European Commission, Directorate-General for Education and Culture. (2004). *Improving the education of teachers and trainers: Progress report*. Brussels.
- Homans, G.C. (1958). Social Behavior as Exchange. *American Journal of Sociology*, 63(6): 597-606.
- Kovshar, O.V. (2017). Partnership interaction of the educational environment of preschool and out-of-school educational institutions in the child's creative development of before school age. In *Proceedings of the International Scientific Conference "Science of the 21st Century: Problems and Prospects of Research"*, Vol. 4. Warsaw, pp. 55-58.
- Kulinka, Yu.S., Sukhentseva, L.L., & Zhitnik, N.V. (2014). *Modernizatsiya metodychnoyi pidhotovky maybutnoho vchytelya trudovoho navchannya na osnovi kompyuternykh tekhnolohiy* [Modernization of methodological preparation of the future teacher of labor training on the basis of computer technologies]. In *Upravlinnya yakystyu osvity: Dosvid ta innovatsiyi* [Management of quality of education: Experience and innovations]. Dnipropetrovsk: IMA-press, pp. 378-405.
- Liaudis, V.Ya. (1980). *Psikhologo-pedagogicheskiye problemy vzaimodeystviya uchitelya i uchashchikhsya* [Psychological and pedagogical problems of interaction between a teacher and students]. Moscow: Enlightenment.
- Mead, G.H. (1967). *Mind, Self and Society from the Standpoint of a Social Behaviorist*. The University of Chicago Press.
- Prokhorov, A.M. (Ed.). (1991). *Bolshoy Entsiklopedicheskiy slovar* [Large Encyclopedic Dictionary]. Moscow: Sov. Encyclopedia.
- Savchenko, K.Yu. (2012). *Formuvannya profesynoyi kompetentnosti zasobamy modelyuvannya pedahohichnykh sytuatsiy za zanyattyakh u vyshchykh navchalnykh zakladakh* [Formation of professional competence by means of modeling of pedagogical situations at classes in higher education institutions]. In *Zbirnyk naukovykh prats Poltavskoho natsionalnoho pedahohichnoho universytetu imeni V.H. Korolenka* [Collection of scientific works of the Poltava National Pedagogical University named after V.G. Korolenko], Issue 10, pp. 257-262.
- Savchenko, L.A., Savchenko, K.Y., Marchenko, A.A., & Pylnik, R.A. (2018). Innovative technologies of pedagogical diagnostics as a means of improving the quality of future specialists' education. *Espacios*, 39(49), 20. Retrieved from <http://www.revistaespacios.com/a18v39n49/a18v39n49p20.pdf>.
- Sheremeta, P.M. & Kanishchenko, L.G. (1999). *Keys-metod: Z dosvidu vykladannya v ukrayinskiy biznes-shkol* [Case-method: From the experience of teaching in the Ukrainian business school]. Center for Innovation and Development.