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Problems of the content realization of electronic (remote) educational resources in vocational education and solutions to them

Słowa kluczowe: edukacja zawodowa, elektroniczne zasoby edukacyjne, metody adaptacyjne, nauczanie na odległość, metodyka i technologia kształcenia zawodowego

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From year to year, the specialists in the utilization of electronic educational resources have been disturbed by the problem of a certain detachment of some part of participants in educational process from the use of educational material, spread through the electronic resources of the institution, as well as through the World Wide Web (Internet), that occurs for both learners and teachers.

However, that is associated not only with insufficient quality of training material or lack of interesting graphics, video and audio accompaniment. Research in the utilization area of electronic educational resources shows[2] that the problem

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[2] See: L. L. Bosov, Didactic and design-ergonomic requirements to the electronic textbook/L. L. Bosova, D. I. Mamontov, A. G. Kozlenko, V. V. Terenin /Educational Policy. 2011. No 6. p. 112–119; L L. Bosov, A typical model of an electronic textbook / L. L. Bosova, D. I. Mamontov, A. G. Kozlenko, V. V. Terenin / Open and Remote Education. Tomsk. 2012. No 2 (46). p. 58–65; L. L. Bosow, Electronic textbook of new generation: the concept, structure and requirements /L. L. Bosov, E-Resource: ito.su/41/plenum/Bosova.html; A. M. Gurzhiy, Computer science and technology [textbook for students of vocational-technical educational institutions] /A.M.Gurzhiy, N. I. Povoroznyuk, V. V. Samsonov, Kharkiv, "SMIT", 2007. p. 352.

lies not only in their quality, but also in motivation[3] of the users. A comprehensive solution to this problem is necessary.

The scientific review of publications revealing the problems of the usage of electronic resources in the educational process and direct psychological and pedagogical problems, allowed identifying six major causes of the abovementioned problems.

1. Poor perception of content (non-perception) of electronic resources in the learning process is the current problem. The part of learners, and sometimes the teachers themselves, focus on memorizing a certain amount of information (rules, formulas, statistical data, etc.) regardless of the subject matter behind that information.

At the first lessons, the trainees believe that the content of the subject lies in a set of rules and facts. They believe that memorizing the basic terminological systems and their correct connection allows for a full utilization of the resource of the acquired subject in future. Therefore, according to their mind, it is necessary to learn as many new concepts and rules as possible, so in this case the basis for their implementation in practice is already prepared. However, that is not true.

It is necessary to remember that a person develops their knowledge through images. Moreover, the larger amount of and the simpler the obtained information transformed during their development in the manner of learners mental activities, the more active its utilization will be achieved in future. As an example, your own experience of a new material development can be recalled, namely when the information looks like being organized by itself in the desired image almost without your participation. You have not yet finally formed the idea, but the image has already been formed and it is ready to be implemented in the idea through the verbal phase of communication or visualized through a graphic image displayed (figure).

That becomes apparent due to the brain training, when the permanent use of similar images activates their spontaneous, intuitive recognition, and, afterwards, a new precise result is formed. That is akin to physical exercise for certain muscles in sport.

2. As a rule, the problem is not in the contents of a program or a textbook.

The most attention of modern educational resources (particularly electronic, remote ones) has to be given to training, development of practical skills of the usage of the obtained knowledge and skills.

That is of critical importance for the process of profession acquirement and achievement of higher qualification in it. Modern educational systems for eval-

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[3] V. T. Lozovetska, Conceptual ambush of professional self-development of a modern person / Nauk.visnyk of IPTO of the NAPS Ukraine. 2011. No 1, p. 33–39.

uation of the results of training involve mainly the utilization of test systems, rarely trainers and simulators. But, the practical, training side of acquiring the profession, the use of non-standard situations, and search for a positive way out from the existing production situation are valued the most at the labour market and through the employers.

Therefore, the more adaptive-oriented the training programs developed, and the more capabilities and features of the learners will be taken into account, the more individually and personally focused the final training trajectory on a trainee will be.

3. Alignment of a clear and personally oriented technology for professional training by using the adaptive methods of work between the learners and educational system (especially important for remote learning systems), is the main objective of its structure formation, and only at the next step the question of the content should arise.

The compliance of the procedural side of training for profession acquirement in the present realities of educational environment is the primary matter, and the content (perhaps unfortunately) has already become a secondary one.

However, that is how it looks like. In fact, the division into primary and secondary issues in this case cannot be solved. That is akin to the eternal question, "Which came first, the chicken or the egg?" That is rather an infinitely interconnected procedure, when the content orders a tool for its implementation, and the tool puts out certain requirements to the content and logics of its statement.

This conclusion (possibly a polemical one) arises based on practical experience of the implementation of educational electronic resources, particularly with the remote form of training.

The most significant in the remote individualized form of education is the training trajectory formed by data arrays. The most complete and creative assimilation can be verified by the system of questionnaires and tests.

Elements of training, currently offered for free or relatively free application, from platforms for tests creation can be used. These information systems, serving as designers of tests and questionnaires, can be used in vocational education for the implementation in electronic educational resources. In particular, they have received a certain spread at schools and educational resources in Ukraine.

The tests represent an intermediate or final stage of training, but it has to be taken into account that management subsystem of information training environment should be present in any educational system, namely the management of organizational and pedagogical process LMS (Learning management system) and the management of didactic-psychological process CMS (Content management system). As the former subsystem forms the security feature, the latter is the main function where the goal of training is realized.

Along with the proposed system of tests for verification of the results of training, that is based on the processing of large data arrays, similar information is set in the accompanying content of any text-based content, namely graphic, video and audio information. The implementation of any modern educational system becomes unrealizable without that.

Trainers and simulators are typical examples of such content utilization in the information educational resources. The most famous example since the days of analogue content can be found in educational approaches in military personnel training, where such training of pilots, tank crews and others took place through trainers and simulators at the primary, propaedeutic stage. That was necessary because of the factor of possible occurrence of abnormal situations during training that could lead to people's death or their injury, as well as to enormous material damage by the aircraft accident, etc.

But, in olden days, only militaries with virtually unlimited budget could afford the development and manufacturing of trainers and simulators based on analogue devices requiring considerable material resources.

Nowadays, modern electronic, digital and discrete devices, as well as up-to-date information technologies, with their mostly unlimited resources for large-scale data processing, enable generation of trainers and simulators for the majority of the world's industrial professions at a relatively small cost and consumptions of material resources.

Precisely, these trends are widely used by the most modern companies, engaged in the development and production of simulators and trainers for vocational education.[4]

Such innovative organizations involved in the development and production of trainers and simulators for militaries (pilots and tank crews etc.) exist both in the world and in Ukraine. And under certain government work or purchase orders from educational institutions, employers, they could develop trainers and simulators for the majority of industrial occupations requiring prior training courses without direct usage of the expensive and difficult-to-manage devices (for instance, driver, craneman, walking excavator operators, welder etc.).

Like any other educational technology, the technology of utilization of electronic sources (including their remote usage) always has certain time limits. Naturally, if the course is not tied to any end date, then the actual learner chooses the speed and terms of its assimilation.

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[4] VV. Yurzhenko, 3D, simulators and other innovative education approaches for PTO system / Scientific-methodical provision of the vocational education and training: materials of scientific-practical conference (Abstracts). – Kyiv, Institute of professional-technical education of the NAPS of Ukraine, 2014. – P. 107–109.

Since it is impossible to lose 10 kilograms in 5 trainings, which is conditioned by the rate of metabolism in human body, there are certain limitations of the body in the speed and intensity of information processing in its various manifestations as well (visual, aural, tactile, and gustatory, etc.).

Most of modern professions imply that their fundamental assimilation takes years of study and practice. And, if the educational system promises that you will succeed in 3–6 months, then look for a footnote – asterisk, since something has to be wrong there. Especially, this mostly concerns complicated professions with a lot of practical skills that, initially, in addition to the acquirement of the professional knowledge component, also includes a huge amount of laboratory workshops and practical use of these competencies in a real-life manufacturing environment, under surveillance of the educational system, via supervisor of this practical course or the tracking on implementation of these skills is provided using an electronic monitoring system, when the passing of certain control points and possible return on a repeated circle by the trainee in case of critical errors is controlled automatically. That is how any modern educational system works. Just that very method in its technological sequence serves for the formation of professional competence.

To urge the learner forward emotionally in a certain way, to make the training process be more dynamic, bright and interesting, it is also necessary to carry out such activities in a playful way, regardless of the age limit of trainees. The investigations in the field of gaming activities have shown[5] that game components of training accelerate the assimilation of knowledge and skills of the learners of any age, in different extent.

There is a wide variety of modern games (quests, arcade and action games, simulators (technical, arcade), strategy and role-playing games, etc.) allowing creating a game-based educational technologies for the development of not only the knowledge component of the profession, but also the abilities and skills by self-embedding into training devices and simulators.

And it is important, that the technology has to allow for smooth and regular acquirement of professional components, unless the ultimate priority of assimilation of the profession in a very short period of time is excluded. But, this is another question with other methods and training components, and also another training system working on the body deterioration.

The present issue under discussion consists in the systematic and optimal training course under the profession. Thus, it is better to study 3 times a week

[5] N.V. Kudykina, Training of teaching staff in the utilization of modern gaming technology in educational process / N.V.Kudykina // Res. Notes KITEP. Psycho-pedagogical problems of professional training of specialists in tourism in terms of continuous education. 2001. No 2. p. 163–166.

for an hour, than for three hours once a week because the quite long experience shows that an exhausting race for knowledge is needless, since the trainee tires rapidly and efficiency of their work falls at least several times.

Nevertheless, the process of the acquirement of profession must be sufficiently comfortable and excludable from any psychological non-perception and, finally, rejection.

4. It is desirable to somehow immerse a person acquiring the profession into the professional area at the course. That is why constant communicating of the learners with their classmates, teachers, industrial personnel, is of great importance. They absorb the atmosphere of professional linguistics and semantics. Therefore, during the remote training, a great way to speed up the development of professional terminology series lies in surrounding themselves with these terms in the living space. Anyone who develops a new profession or receives a new qualification should be involved into the atmosphere and acquainted with terminological component, not only in class but also at home, at work and on the way. As is known, the more the better.

For example, installing special software on a smart-phone and computer that brings a new term in graphic form occasionally, with some interesting interpretation, attracts the attention of not only the trainee but also their colleagues, might be beneficial. In social networks, it is important to find people with similar professional interests, who are able to discuss the problems arising in the progress of the development of new components of the acquiring profession.

It would also be useful to include the opportunity to consult high-level professionals about specific issues concerning the components of the training system.

5. There is a problem of verification of the results of the training in remote educational form. That particularly concerns the professions with a certain form of restrictions on medical and psychophysiological features.

Therefore, prior to the beginning of the training, the test system allowing guidance to the learner should operate welling estimation of an appropriateness of either profession or qualification acquirement.

6. There are technical problems, especially at the peripheral professional educational institutions of Ukraine, arising from the existence of the networks disabling the support of crucial traffic for processing large data arrays, namely large video streams of high resolution; support for remotely located trainers and simulators, graphical support of professional games via on-line, etc.

The demands to modern networks for electronic educational resources meet an accurate batching of traffic and services, depending on the individual training path of each learner in both remote training technologies, and in the internal form thereof.

On the one hand, the system should take into account and allow for or encourage the user's experience of the trainees, namely their ability to acquire the most comprehensive scope of professional competence and qualification. However, the abovementioned technical limitations arise there again.

This important problem also exists in the case of wireless Internet, enabling even more dynamic, efficient and comfortable utilization of educational resources. However, the limitations of the resources in that case become even more critical. Currently, wireless 5G standard allowing reaching the data transfer speed above 10 Gbit/s, that is even higher than that of some existing fibre-optical backbones, is under development. Thus, specific wireless standard will largely predetermine the mobility and accessibility of remote learning.

Conclusion

The synergy of synergistic unifying process for the modern educational methods, technologies with novel information technologies, widely spreading in education system, makes much safer, efficient and faster training of the next generation of trainees by the most necessary and prevailing professions. Moreover, the motivational components of the educational process have to be remembered, since any new generation is always more intensively interested in innovations in the field of technologies and engineering. Thus, the implementation of novel informational-technological training resources, including modern configurations and methods of electronic educational resources with the trainers, simulators, etc., raises an interest in being acquainted with them, and also with the content of the training through their virtue. These are the problems, solutions and logics of embedding novel informational and technological resources into professional education.

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Summary

The article examines the existing problems of implementation of the learning process using electronic educational resources, including remote training process. The utilization approaches of large data arrays for remote and individual training, including the usage of trainers and simulators for the vocational education system, are presented.

Problemy realizacji programu nauczania z zastosowaniem elektronicznych zasobów edukacyjnych (na odległość) w kształceniu zawodowym oraz sposoby ich rozwiązywania

Streszczenie

W artykule przeanalizowano istniejące problemy związane z realizacją procesu uczenia się za pomocą elektronicznych zasobów edukacyjnych, w tym kształcenia na odległość. Ukazano podejścia do korzystania z dużej ilości informacji w nauczania na odległość oraz w indywidualnym nauczaniu, w tym przez treningi i symulatory dla systemu edukacji zawodowej.