

## II. ПРОБЛЕМИ МЕТОДИКИ НАВЧАННЯ ФІЗИКИ

### ADVANTAGES AND DISADVANTAGES OF THE USE OF ON-LINE LEARNING

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*The article considered such concepts as "d-Learning", "mobile learning", "online learning" or "e-Learning", "virtual learning". Taking into account the modern experience of European countries, we want not only point out the advantages and disadvantages of d-Learning, but also to reveal its structure and the relationships between its components.*

**The formulation of the problem.** In the modern world except the traditional lesson training in the "student-class-teacher format" distance learning (d-Learning) is increasingly being implemented into practice. Accordingly, **distance learning** is considered to be: a form of training that is based on the use of a broad spectrum of traditional and new information technologies and their technical means which are attracted to deliver educational material, its individual learning, organization of an on-line exchange between a teacher and a student; learning at a distance, which is realized with the help of modern computer and telecommunication technologies in real time or asynchronously. According to the studies of S. O. Semerikov the introduction of d-Learning into education is explained by the fact that a new educational paradigm, in the basic of which there is the fundamental studying, involves qualitatively new goals of education, new principles of the selection and systematization of knowledge. The focus of the educational system on the personality as the main social landmark is revealed in different directions, where the leading one is creating for any member of the society the opportunity of getting education of any nature and level. Accordingly, in our view, there is a **problem** – what the expediency of the use of d-Learning in a secondary educational institution (School) is.

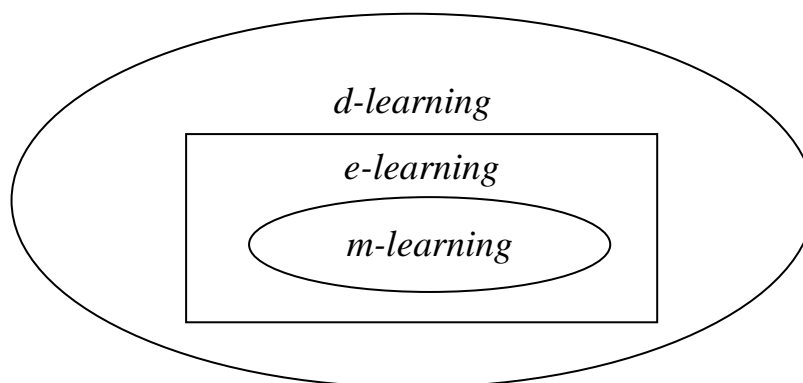
**The analysis of recent studies and publications.** In practice d-Learning is often identified with such concepts as "mobile learning", "online learning" or "e-Learning", "virtual learning". A Ukrainian scientist and methodologist S. O. Semerikov defines *mobile learning* (m-Learning) as the following: it is a new technology of study based on the intensive use of modern mobile tools and technologies, which opens new possibilities for those who face difficulties in learning. In accordance with the definition of a famous modern British project MoLiNet, mobile learning is any activity that provides the most productive information sharing between people and it is accomplished by using compact, portable mobile devices for the purpose of support, facilitation and ensuring the availability of studying. Accordingly, there are the following modern mobile devices: laptops, netbooks, tablets, mobile phones, smartphones and communicators.

Marc Rosenberg [4, p. 10] understands the notion «*e-Learning*» (e-Learning) as the use of Internet technologies for giving a wide range of solutions that provide advanced knowledge and the productivity of work. Allison Rozzett [2] considers *Web-training, e-learning or online learning* to be the preparation of frames that are on the server or on a computer that is connected

to the Internet. The UNESCO experts point out that e-learning is the learning via the Internet and multimedia [1, p. 7].

The concept of "virtual learning" is explained by R.B. Kotsyuba as the following: the process and the result of interaction between the subjects and the objects of study, which is accompanied by the creation of two virtual educational spaces, the specifics of which is defined by the given objects and subjects. R. B. Kotsyuba indicates that virtual learning is closely connected with distance learning, but it is not limited only by it. It can be (and is) in an ordinary face to face interaction of teachers and students and the researched objects. According to the results of theoretical studies, held at the Department of technical Cybernetics of Informatics and computer engineering Faculty , the concept of "virtual learning" is understood as the training that is performed with the use of technological regimes of client-server (on the remote resources of the Internet environments) and the customer-client (on the resource of the client’s machine) and it is organized in such a way that the user can consider the computer-integrated complexes of virtual learning devices as a great united learning environment that simplifies the process of passing the stages of learning greatly. Semerikov S. O. believes that virtual learning contains all forms and approaches of learning with the use of the Internet, i.e. it is an amalgamation of mobile and electronic learning.

**Selection of unsolved parts of the general problem.** The definitions given above allow us to assert that distance, mobile, electronic, virtual learning is difficult to differentiate according to the conceptual system. According to the studies of S. O. Semerikov distance learning is a more general concept and it includes electronic and mobile learning (picture 1).



Picture 1. The structure of distance learning by S.O. Semerikov

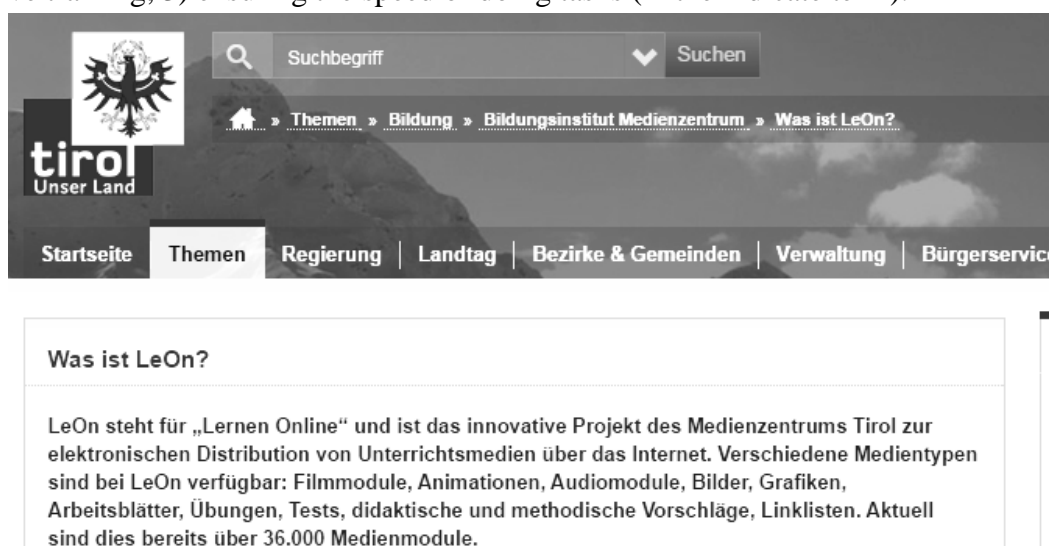
In the scientific literature they often use the term "environment", but not "learning": distance, mobile, electronic and virtual environment. We can note that the place of virtual learning is not specified in the structure of distance learning (pic. 1), given by S. O. Semerikov . Therefore **the aim of this article** is that, taking into account the modern experience of European countries, not only point out the advantages and disadvantages of d-Learning, but also to reveal its structure and the relationships between its components. Accordingly, **the main objective of this work is to** determine the expediency of using the d-Learning in secondary school.

**Exposition of the basic material.** D-Learning gained its special popularity in Europe and the United States, where the largest universities offer such training not only locally but provide an opportunity to gain extra knowledge in any part of the world: Stanford University, Munich

and Geneva universities, Polytechnic School in Paris, universities of Rome and Copenhagen. The platform of mass «online courses» Futurelearn, where there are more than 20 well-known British universities, including the universities of Warwick and Bata, Royal College, London and St. Andrew University, was established in the UK in December 2012. Thus, d-Learning in Europe and the United States is a common form of learning.

To achieve the formulated goal, we are to consider the content, peculiarities and the didactic possibilities of each constituent of d-Learning – e-Learning, m-Learning, virtual learning. Since, according to the research of S. O. Semerikov, mobile learning is a part of electronic and d-Learning, first we are to analyze the components of mobile learning, using the content of modern European educational platform LeOn (Tyrol, Austria), which is designed for "online" training of all schools in Tyrol (pic. 2).

Educational platform LeOn means "learning on-line". It contains the following training materials: movies, animations, audio modules, worksheets, exercises, tests, didactic and methodical recommendations. Accordingly, LeOn aims mainly to the usage of video. As they are downloaded from the Internet, in this case any modern equipment like: mobile phone, tablet personal computer, Pocket PC, Smartphone, laptop, etc could be the means of training. Therefore, these devices are the means of mobile learning. Different definitions of mobile learning are offered in scientific literature. The common thing about them is that a physical connection with the cable network is optional for mobile learning. So, according to the researches of T. Heorhiyev [3], a *feature of* mobile learning is that it provides the subject of learning with a greater number of "degrees of freedom" – the greater interactivity and freedom of movement. It provides the individualization of education, gives equal access to academic information. Accordingly, the use of mobile learning devices provides the following didactic functions: 1) taking into consideration the individual characteristics of students – informal, personalized, situational training; 2) creating conditions for the combination of individual and collective training; 3) ensuring the speed of doing tasks (in the indicate term).

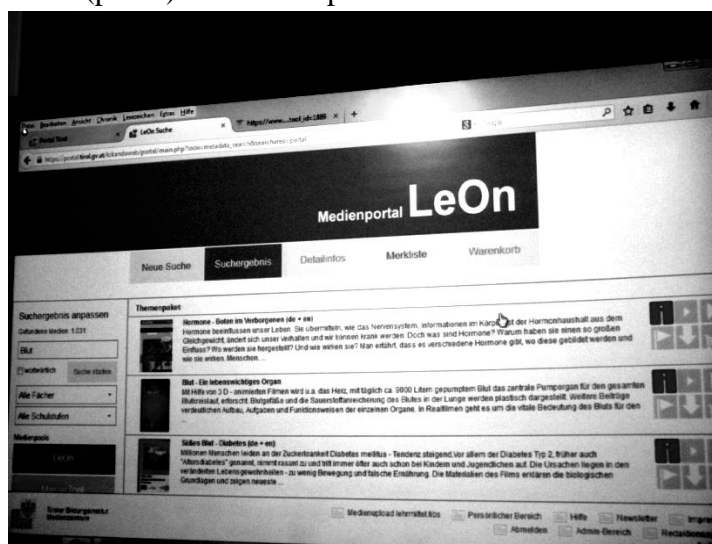


Picture 2. The information about the educational platform LeOn at the portal Tyrol

Thus, Ye. Wahner and P. Wilson [5] point out such *advantages* for mobile learning as: 1) creating conditions for transition from model "command and control" to a model of "cooperation

in learning"; 2) the attractiveness of learning; 3) availability and rational training – providing the opportunity for a student (a user) to change easily the workplace through the usage of mobile applications with the help of mobile devices (mobile applications); 4) synchronous instant active communication between a teacher and students. However, except the benefits of using mobile devices there is also a number of **disadvantages**: 1) low battery life of mobile devices, which is associated with the usage of a touch panel and a colour screen; 2) additional burden on eyesight; 3) fragmentation of learning – students may be placed in situations that distract their attention.

We can note that mobile learning tools include both working on the basis of their own software and the Internet. In the first case the possibility of using application programs, including educational purposes, is limited by the memory of mobile learning devices: 2 GB for a laptop and a Tablet PC, 512 MB for a Pocket PC, 32 MB for a Smartphone and 4 MB for a mobile phone. Therefore, we believe that the usage of the Internet by application mobile devices can solve this problem i.e., the ability to work in a mode of "online" (e-learning). For the purpose of determining the feasibility of the application of mobile devices for learning in school, we are to consider the possibilities of e-learning, using the contents and didactic purpose of the educational platform of LeOn (pic. 3) as an example.



Picture 3. The components of the educational platform LeOn

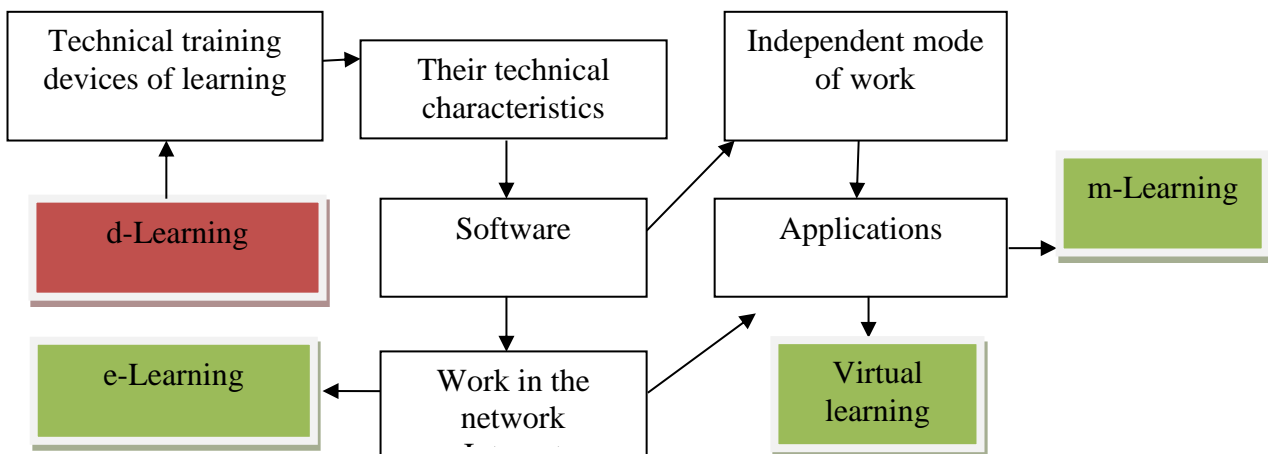
Accordingly, the educational platform LeOn contains the following components: 1) the search of electronic materials on the list links: images, charts, handouts, media modules; 2) the preview training materials; 3) a brief description of the educational films: which class a film is for, its duration, the primary content; 4) exercises and tests to the offered films; 5) the possibility to “Stream” and "Download" the proposed materials. Since not only the above mobile devices and desktop PCs, can serve the means of e-learning, which provides a connection to the Internet, it empowers students to access information in the database.

Therefore, the use of electronic means in the mode of "online" provides the following **advantages** of learning: 1) quick and easy access to the information, i.e. to the knowledge base contained on the Internet; 2) guided interaction between a teacher and students in a form of a dialogue, which in some cases may approach to on-line interaction in traditional educational

technologies; 3) verification and control of knowledge at a distance; 4) organization of laboratory workshops through the implementation of remote network access to a real laboratory equipment; 5) individualized learning; 6) possibility of collaborative learning through the exchange and sharing educational content by some users linked together.

In our opinion, the use of e-learning in practice also has a number of *disadvantages* compared with a mobile learning: 1) interaction between students and a teacher is held with the help of e-mail with the loss of time on the regular checking of mail; 2) communication between the participants of educational process occurs only through the access point to the Internet; 3) feedback between a teacher and students are not direct, but indirect via e-mail (Web-sites, forums, chats, etc.); 4) evaluation and control of knowledge are limited in time, in a standard test form.

Thus, the given advantages and disadvantages of mobile and e-Learning indicate that the feasibility of applying them in school is to be determined not only by the technical features of learning devices, software, but also by didactic purpose and features of the interaction between a teacher and students. It allows us to affirm that there is a direct relationship between the means and forms of learning and it defines the structure of d-learning (pic. 4).

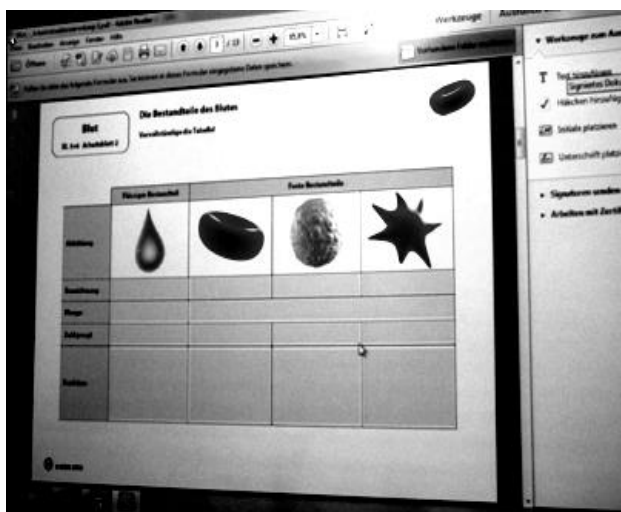


Picture 4. The suggested structure of d-Learning

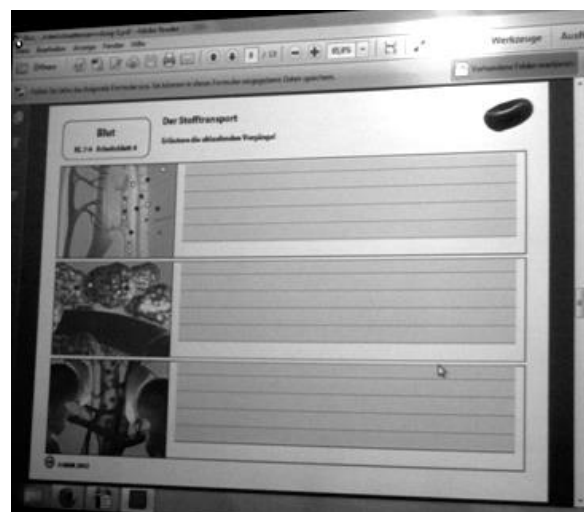
In our view, not only a didactic purpose has an essential importance for the choice of the type of training but the possibilities of applications that make use of the appropriate training tools. As you know, more modern pedagogical software, educational films, the access to which is possible both via the Internet and in an independent mode of work of technical devices of learning, focused on the use of virtual reality. In scientific literature the notion «*virtual reality*» is understood as the world generated by technical devices, which is transmitted to a man through the usual perception of the material world of feeling. Modern systems of virtual reality is the visualization in the real time, interacting with 3-D systems creating 3-d images, modeling, intuitive input of information.

According to the above definitions of "virtual learning", proposed by scientists, such training is based on the usage of modern technical means which allow to observe or interact with objects in virtual reality. Therefore, for the purpose of showing educational material, increasing motivation to study European educational platform LeOn by the objects of virtual reality chooses

mostly those processes, phenomena, components of devices that are difficult to demonstrate to students in real conditions. Accordingly, LeOn offers teachers and students educational films that contain 3-d images. Educational films are built on a single principle: 1) modelling of the life situation that demonstrates the importance of the material, which will be learnt; 2) explanation of new material based on modern theories. The peculiarity of a virtual learning educational platform LeOn is the fact that after watching the chosen educational film students perform such tasks as: 1) the systematization of knowledge based on filling the on-line summary table (pic. 5); 2) accomplishment of tests of individual tasks based on the handout, printed out LeOn (pic. 6). Accordingly, we provide the following **advantages** in the use of virtual learning in the educational process,: 1) psychological adaptation of students - the presence of a teacher is not obligatory, which increases the concentration of students on educational materials and which doesn't cause fear in anticipation of the responses of a teacher; 2) economic effect – you don't need large funds to use virtual curriculums, 3) influence on other kinds of students' activities (cognitive, creative) and on the individual as the whole; 4) effect on all the organs of the senses and focus on a new development of intelligence.



Picture 5. General table of the chosen theme



Picture 6. Handout, which is offered by educational platform LeOn

In our view the use of virtual learning in practice has a number of **disadvantages**: 1) influence on mental and physical health of students with prolonged “immersion” in virtual reality; 2) increased inclination of senior students for computer addiction; 3) principle disability to complete the replacement of the personal contact a pupil and a teacher, processes of their personal communication.

**Conclusion and prospects for further research.** Thus, the indicated advantages and disadvantages of d-Learning components (mobile, electronic, virtual learning) allow us to answer the question posed earlier about the expediency of d-Learning use in school: since traditional lesson studying is limited in time, then the d-Learning thanks to modern means of learning empowers learners in choosing not only the time and place of learning, but the teacher and the appropriate information. Therefore we consider the use of d-Learning in combination with traditional lesson training of students to be reasonable. Accordingly, the need to select technical devices for the implementation of d-Learning of high school students arises.

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*Science interests:* modern information technology as "d-Learning", "mobile learning", "online learning" or "e-Learning", "virtual learning".

**ТЕХНОЛОГІЧНІ ОСНОВИ ФОРМУВАННЯ СВІТОГЛЯДУ УЧНІВ  
МАЙБУТНІМИ ВЧИТЕЛЯМИ ФІЗИКО-ТЕХНОЛОГІЧНОГО  
ПРОФІЛЮ**

**Петро АТАМАНЧУК, Олексій НІКОЛАЄВ**

*Стаття присвячена дослідженню проблеми підготовки майбутнього вчителя фізики до формування світогляду учнів, наводяться теоретичні основи формування завдань рівневого змісту низького, оптимального та вищого рівнів з відповідними прикладами.*

*The article investigates the problem of training future teachers of physics to the formation of world students are Theoretical Foundations of tasks tiered content low, best and highest levels with relevant examples.*

Світогляд виник завдяки постійному прагненню людини осмислити смисл і мету її життя – що робить людина і для чого, які її прагнення в житті та являє собою сукупність уявлень про світ та місце і роль людини в ньому. На цій підставі світогляд визначають як сукупність поглядів, оцінок, принципів, що визначають загальне усвідомлення та розуміння навколишнього світу, місця людини в ньому та її ціннісні орієнтації. Світогляд поєднує в собі переконання, ідеали, цілі, мотиви поведінки, інтереси, ціннісні орієнтації тощо. Формування світогляду відбувається за допомогою знань, які є підставою чітко та послідовно обґрунтовувати погляди людини. В ході появи світоглядних ідеалів людина здатна здійснити оцінку цінності подій, які відбуваються навколо неї (наприклад добро та зло) [8].

Проблема формування світогляду досліджена у ряді робіт провідними вченими, зокрема: Атаманчук П.С. (технологічні основи управління формуванням світогляду як однієї із базових людських якостей), Бургун І.В., Каменецький С.Є. (виділення компонентів та показників сформованості наукового світогляду), Яковлева О.М., Садовий М.І. (трактування теоретичних засад наукового світогляду), Мещанський В.Н., Разумовський В.Г., Гончаренко С.У. (основи формування наукового світогляду).