

Learning Models in Sustainable Education

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Abstract. Digital technologies can be used for the education system crisis resolution in the modern context. The conducted studies point to the necessity of the integrated learning model development using distance learning technologies and e-learning for the sustainable education support. Due to the diversity of models the methodology of their application shall be developed and the degree of application efficiency for different form of education shall be assessed.

1 Introduction

Currently, digital technologies become all-encompassing [1, 2], including the education. The traditional education system suffers the crisis that manifested worldwide to a greater or lesser extent [3]. The either solution is the development of barrier-free space in education using innovative educational technologies for the sustainable education support [4].

It is reasonable to pay a special attention to the following main directions of modern telecommunication technology application:

- Formation and publishing in the public domain of modern educational common resources;
- Development of advanced professional retraining system for employed citizens and temporarily unemployed citizens on the basis of distance learning technologies' application [5];
- Creation of the National Common Education Space;
- Preservation, development and effective use of the National Academic Potential;
- Provision of global network access for applicants;
- Provision of equal access to high-quality education irrespective of status, income, living conditions, circumstances and other factors [6].

The challenge of education quality improvement is something special:

- Reliable assessment of educational services' quality on the basis of the learning process individualization by means of distance learning technologies;
- Simultaneous existence of two independent didactics: traditional and distance learning;
- Integration of diverse systems for organization of knowledge acquisition by students [7];

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- Design of models for different educational process options upon combination of traditional and distance learning;
- Revealing and substantiation of organizational and pedagogic conditions for distance learning models implementation into the existing system of higher education;
- Effective training of specialists in information technologies and qualified users;
- Development of software education and testing systems of adequate scale and quality [8].

2 Materials and Methods

In order to carry out the study the method of theoretical analysis of scientific resources, systematization and generalization of scientific conclusions; analysis and self-assessment in the educational system, empirical methods were used. On the empirical study level methods of pedagogic observation, generalization of pedagogic experience were used. Pedagogic experiment, statistic processing of experimental data, method of pedagogic diagnostics.

At the moment in the Moscow International University is organized the educational process for full-time students using distance learning technologies. Classroom and practical studies are given by personal attendance with simultaneous connection via Zoom for videoconferences, online-meetings and distance learning.

3 Results and Discussion

On the basis of conducted study in this sphere, learning models in accordance with the actual established forms of education: full-time, mixed and external are offered.

Let us conditionally introduce definitions as follows: the external mode of study with e-learning elements; the full-time mode of study with e-learning elements; the aggregation of modes using distance learning technologies; the distance course model; the autonomous educational systems; the academic discipline educational and methodological package; case technologies; information resources of educational institution.

As uniting feature of listed models is served the obligatory presence of e-learning elements in the greater or lesser proportion in all modes of study [9].

Now, let us consider in details what is understood under each above-mentioned learning models. The first three models provide an obligatory interactive communication of lecturer and students.

The external mode of study with e-learning elements is characterized by quite gag rule: overview studies, intersession work, examination sessions, the certain package of disciplines to be studied, low contact time, etc. The curriculum for external department shall reasonably include: video lectures, audio lectures, virtual excursions, chats, forums, laboratory sessions, imitation training programmes, teleconferences, network lectures. The distance communication is ensured by broadcasting of traditional classes (lectors and workshops) using modern telecommunication means. Due to the use of above-mentioned means the contact with the lecturer expands. In the result, we obtain some form that is similar by its properties to distance learning procedures.

The studied external learning model requires certain knowledge and skills from the lecturer relating to both webinars and individual work with students in the interactive mode. Communication means, namely, videoconferences, provide the student participation effect in the real classroom. The complexity of lecturer's work is in the increasing number of students participating in the distance classes.

Moreover, the lecturer has to master materials of some similar disciplines and be able to organize students' work united in the group but being at the distance from each other.

There are two main forms of interaction: the distance lecturer and the distance classroom; the distance lecturer, the distance lecturer-moderator and the distance classroom. The use of this form enables the real-time distance communication. Students can obtain consultations and complete tasks, communicate with each other directly from home.

The time mode of study with e-learning elements. The full-time mode of study provides a live contact with the lecturer: lectures, workshops, practical training, tests and examinations. The application of distance learning technologies provides the following studies: summarizing lectures, forums, design activity, conferences with leading specialists.

The following interactions in the considered structures are proposed: model “the distance lecturer, the full-time lecturer, students” model “the moderator, the presenter, the distance audience, live audience”.

Such models can be used for online-festivals, webinars, videoconferences, online-lectures. Participants present their projects or reports with presentation. Contributions can be discussed on forum or in chat; and questions could be asked in person or live.

In simultaneous distance and intramural learning activities it is required to arrange the broadcasting of classroom, control of speakers and audience (both intramural and distance), communication of participants via dashboard. Such real-time activities (both personal and distance) shall become the form of interaction of both lecturer and students and students themselves. On the basis of videoconference, the new organizational form of education (virtual classes) is developed. The state-of-the-art technologies of teleconferences used for educational purposes allow groups and separate students to communicate with lecturers and each other being separated by distance.

The lecturer being in the classroom broadcasts the lecture via dashboard. Students shall connect via Internet to the live broadcast. The lecture can be open with guest access or closed with login and password authorization via dashboard. The application of this form foresees the summarizing lectures on the selected discipline.

There is an option to give the lecture (consultation, recitation) simultaneously with two lecturers in dashboard upon the distance interaction. This form is designated for webinars and oral student recitation. Provided that Web-cameras or chat are connected. One lecturer performs functions of moderator, gathers visiting statistics. The second lecturer explains the material upon the connection to the academic activity. The moderator can check answers on question in the chat.

Such models provide students access to reports, conferences, workshops that are given by scientists, practitioners, leading lecturers regardless of the institution. In the result the student can obtain the information from various sources.

The application of these models allows to increase the share of individual work in the total academic load. The wide use of computers and telecommunications, the introduction of self-paced study, modular study and other didactic and organizational measures offer the new modified full-time mode of study.

The aggregation of study modes (full-time, external, mixed). The mentioned model provides the following interaction modes: the lecturer, the intramural audience, the distance audience.

The application of the above-mentioned model is possible for lectures, practical training, final control, individual study. For example, the individual study in the external mode provides the self-paced study and the possible selection of disciplines studied by the student; examinations will be passed, when the student considers himself/herself ready; within the intersession period contacts with the lecturer shall be intensified due to the use of information and telecommunication technologies.

Here is an example of full-time students' lecture. The lecturer in the classroom gives a lecture or practical session with attendants and other students shall connect in the distance mode via Internet using the link on the educational institution website. For non-attending

full-time students due to various reasons is available the online interaction mode (the possibility to ask the lecturer questions, participate in discussion). Students of external, mixed, non-residency modes of study shall connect to the broadcast as the participant mode in order to obtain the additional information on questions of interest.

Similarly, planned lectures of external and mixed modes are given. In such case for non-attending students is available the online interaction mode and for full-time students – the participant mode. The website training schedule shall be supplemented with the information of the studied subject and lecturers. In order to arrange the interactive communication in classrooms it is required to connect to the lecturer's computer: Web-camera, projector, speakers and microphone. At the end of lecture students can download the training materials.

The following learning models don't foresee the continuous online-interaction of lecturer and students: the distance course model, autonomous learning systems, the academic discipline educational and methodological package; case technologies; information resources of educational institution [10].

In the heart of distance course model appears the distance learning course and electronic textbooks. Autonomous learning systems are designed for education using TV broadcasts and printed training guides. The academic discipline educational and methodological package is based on the modular principle, i.e. the information is provided by means of logically bracketed independent modules. The case technology relies upon the compilation of multimedia teaching and learning aids and their distribution among students for individual learning.

It shall be noted that the developed models provide equal possibilities for obtaining the higher education as the provide the equal access to information resources, interaction with other students.

4 Conclusions

Thus, the application of developed models allows to change the existing forms of education that try to convergent in their development some perspective form, the aggregation of study modes (full-time, external, mixed) with elements of e-learning.

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It shall be noted that even N.I. Pirogov offered to replace traditional lectures with the Socratic method [11]. Accordingly, before each conversation with the lecturer students get acquainted with sources and learning aids, i.e. are getting ready for the planned conversation. With such method applied each literate participant "remotely prepared could individually read leisurely ..." and think through the material from the textbook.

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