

USING VIDEO CLIPS IN LEARNING PROCESS

¹ Pakshina N.A., ¹ Emelianov M.A., ¹ Pravdina M.V.

¹ *Arzamas Polytechnic Institute R.E. Alekseev Nizhny Novgorod State Technical University.*

E-mail: Nataliapakshina@mail.ru.

Abstract. This article describes possibilities of using video clips in learning process. It is stressed that recommendations of psychologists and teachers should be taken into account when developing such learning tools. Video clip "Alexander Lyapunov" is given as examples. The paper was written specially for teachers developing e-learning tools.

Keywords: video clips, visualization, e-learning tools, automatic control.

«A picture is worth a thousand words»

Arthur Brisbane, 1911.

When presenting material, it is not just desirable but necessary to use visual aids. Principle of visualization is one of the essential principles to be followed by the creators of learning tools. This principle was taken as a basis in the textbook of outstanding teacher J.A. Komensky «the World of Sensual Things in Pictures» ("Orbis sensualium pictus") [1] written as early as 1650-1654!

It has become clear that there is no sense in displaying only text on the screen. Multimedia can significantly help assimilate what is being learnt provided special e-learning tools are used.

It is appropriate to mention such philosophy of training as constructionism in which tools matter very much. Canadian theorist of Information Society Herbert Marshall McLuhan once said "*medium is a message*" and explained: "*The media that we use when talking and showing is very important. Sometimes they turn out to be far more important than the content they carry.*"

Although the authors do not fully share the author's opinion, there is no denying that the main task of a teacher is to create the conditions to learn by using effective tools.

It should be taken into account that training material is perceived much easier when using multichannel perception. Efficiency of training significantly increases if both visual and auditory perception channels are used simultaneously (this is called principle of modality) [2]. By acting on different sensory organs, knowledge and information remain in the memory for a very long time.

Moreover, one must recognize that students of the XXI century are characterized by a rather poorly developed imagination, and therefore the use of audiovisual aids in learning process is even more important now than it was 20-30 years ago. The principle of modality can be implemented to create voiced electronic presentations; electronic albums with music, and it should be followed in development of educational videos [4].

There are videos for using at introduction lectures, for demonstrating technological operations, and videos for presenting to students historical background, which can be independent modules of information (Fig. 2).

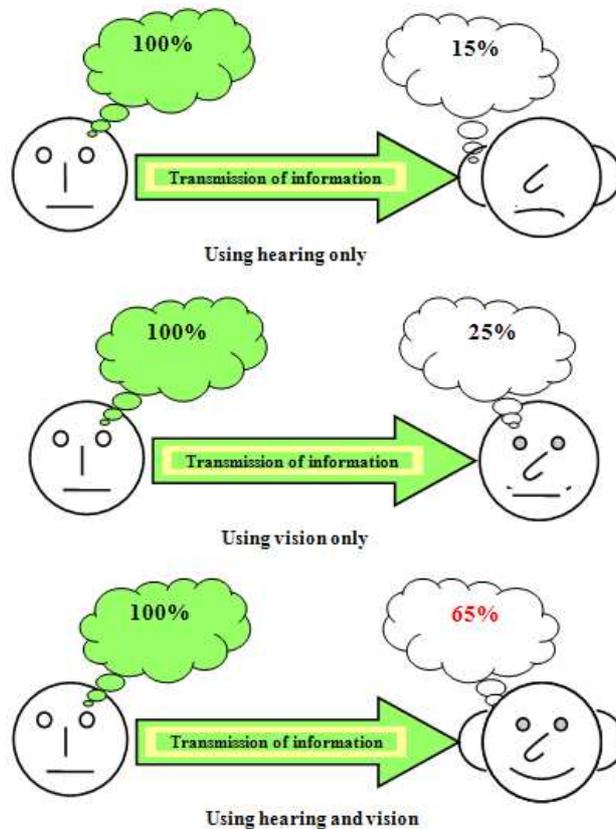


Fig. 1. Principle of modality

The first two types resemble advertizing videos demonstrating application of achievements in control theory. They have to be bright and easy to remember. Videos may not contain any practical information, but make strong impression.

Technological videos have been used at the Department of Applied Mathematics for teaching control theory, computer science and information technologies.

New software product may cause certain difficulties, even with a software manual. The reason probably is that the description of a sequence of actions is too long and difficult, whereas a short video is quite enough to understand principles of operation and features of a program pack or a device. Operational experience with similar products gives reason to state that this form of presenting educational material significantly accelerates learning and enables more robust knowledge. The last type of videos is developed in order to present a block of information. They can be used within a context of lectures as well as a means to occupy short period of time left to the end of the lesson (5-7 minutes).

Such videos are successfully used at the Department of Applied Mathematics of Arzamas Polytechnic Institute. One of them is devoted to the great scientist P.L. Chebyshev, who was one of

the first applied mathematicians. Another one presents information about pioneers of filter theory: R. Kalman, N. Viner, A.N. Kolmogorov, R. Bucy, P. Stratanovich and V.S. Pugachev. In both videos there appear short explanatory texts to most pictures. Videos of such type help students realize how important and necessary their future profession is.

The authors of this paper watched a series of video clips on automation at the International Multi-conference on Systems and Control which was organized by IEEE Control Systems Society in the south of France in October, 2014. Contest of video clips devoted to application of automatic control theory was held, and fifty three five-minute videos created by participants from different countries were presented. The video clips can be watched on the site of the conference <http://www.ieeecss.org/video-contest/submissions> [6]. They demonstrate possibilities of control theory application.

The quality of top video clips shows that our foreign colleagues pay great attention to such learning tools, most of which being created by teams of five to fifteen members. Many clips are devoted to such popular subject as application of quadcopters and helicopters in different spheres of human activity. Especially impressive was video clip “Dance of the Flying Machines” showing flying six vehicles simultaneously and coordinating their motions to music. The clip was created by F. Augugliaro, F.H. Schoellig, and Raffaello D’Andrea (fig. 3).

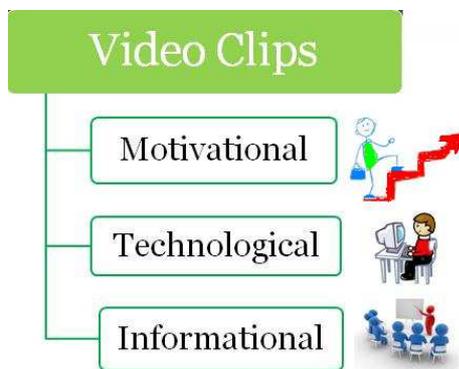


Fig. 2. Types of educational clips



Fig.3. Simultaneous whirl

Most clips looked like commercials, e.g. BMW’ clip demonstrating highly automated driving, though this does not detract from its merit. It can be successfully used at introductory lectures on “Control theory” and “Program orientation course”.

It is necessary to follow basic principles of developing learning tools when creating educational videos, the most important being principle of visualization mentioned above. Not for nothing is the saying “*A picture is worth a thousand words*” used by so many nations: “*Лучше один раз увидеть, чем сто раз услышать*”, “*Le mieux est de se rendre compte par soi-même*”.

There are also some means used to deepen an impression: effect of recognition and effect of beauty. The latter should be taken into account when creating not only commercials but educational

videos. It is a psychological phenomenon which spreads positive aesthetic influence of beautiful models, people, landscapes, etc. [3]. It is desirable for creators of video clips to apply effect of recognition. Interest to the subject will certainly enhance if students see on the screen portraits of known people (famous scientists or their lecturers). It is also known that the shorter video is, the stronger impression it makes. Video should last not more than seven- ten minutes, optimal running time being five-six minutes.

When creating educational video clips, following mentioned principles and rules helps increase efficiency of training and activate perception of information.

The authors have created this video clip to inform students about this great scientist whose scientific work is the basis of many concepts of modern control theory. The video clip represents the main stages of A.M. Lyapunov's life including childhood, youth; work at Kharkov Imperial University and Kharkov Polytechnic Institute, Novorossiysk University and Russian Academy of Sciences. This video clip includes generally known photos as well as unique pictures taken by the authors during trips to Odessa, Kharkov, St. Petersburg and Nizhny Novgorod. Ceremony of unveiling the memorial plate to A.M. Lyapunov in Nizhny Novgorod is added to this clip (Fig. 4, 5). Background music of the video clip is composed by Lyapunov's contemporary P.I. Chaikovskiy.

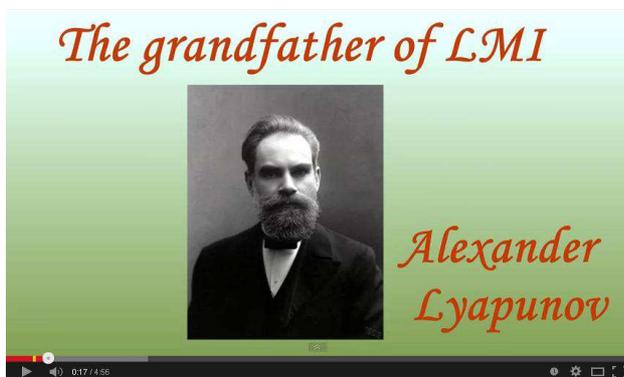


Fig.4. A.M. Lyapunov's portrait

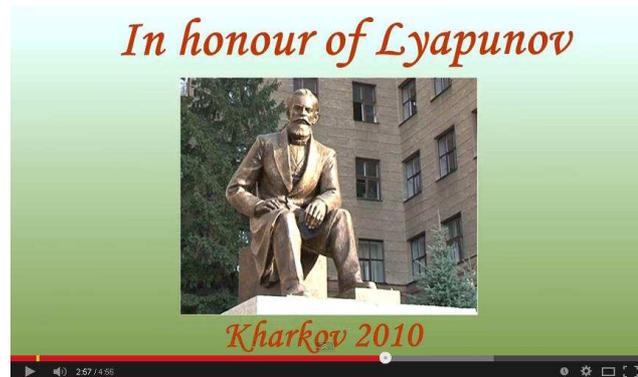


Fig.5. The monument

The video clip is created in Sony Vegas Pro 13.0, has mp4 format, and can be displayed by almost any media player, e. g. VLC media player. Its length is 5 minutes.

To facilitate learning and remembering new material, it is recommended to give students after watching a short test with random sample of questions. When answers are checked, results are displayed on the screen; they estimate how material has been assimilated.

Psychological support of students is achieved with the help of friendly reaction of system to students' "misses". Friendly dialogue and support rather than criticism are offered [5]. Great attention is paid to psychological aspect of result assessment. If all questions are answered correctly, congratulation is displayed on the screen. If a student makes some mistakes, there appears

a table with achieved results and quotes of famous people to encourage students. Different aphorisms are used depending on the results achieved.

Except for a diagnostic function, test serves as a disciplinary function as well. Since students know that they have to do the test, they try to remember and learn information presented in video clip. It is necessary to include in educational process elements for strengthening internal motivation. Testing some video clips on the history of control theory has shown that they help to make learning this discipline more motivated, interesting and vivid. Such learning tools are sure to broaden students' outlook.

The following important detail should be emphasized. Both visualization, and music are, in fact, international languages. Using video clips with music makes watching them not only more comfortable and memorable, but also creates opportunities for international exchange and cooperation among teachers of different countries, for a wider using of similar educational tools worldwide. Numerous video clips in YouTube, the contest held within the "The 2014 IEEE Control Systems Society Multiconference on Systems and Control" and video clips on the site vividly demonstrate it [6].

One of the advantages of using video clips in educational process is that they are short in time. Series of videos can become one of the most demanded sections in university libraries in future. The authors are planning to use video clips as separate blocks of training systems with a competitive element, and as blocks of educational computer games.

References

1. Komensky Y.A. The Elected Pedagogic Works. (transl. from Latin by V.I. Ivanovskii in 1955). – Moscow: Pedagogy, 1982. – Vol. 2, – P. 63, 82 (In Russian).
2. Krechetnikov K.G. Interface design of educational tools / K.G. Krechetnikov // Informatica and obrazovanie –2002.– №4. – P. 69-70. (In Russian)
3. Pakshina N.A. Gostyaeva E.V. Applications of Classic Didactic Principles to Creating of Modern E-learning Tools // In: Preprints 8th IFAC Symposium on Advances in Control Education (ACE 2009). – Kumamoto, Japan. 2009. Flash. P.1-6.
4. Pakshina N.A., Emelianov M.A. Using video clips with applications to learning process // Privolzhskiy Nauchniy Vestnik – 2014. – №12 (40) – Vol. 3. – P.140-143. (In Russian)
5. Pakshina N.A., Pravdina M.V., Krivonogova M.A. Creating user-friendly dialogue in systems of virtual training // Proc. of the 9th IFAC Symposium Advances in Control Education. – Nizhny Novgorod, Russia, June 19-21, 2012, P. 241-245.
6. Video Submissions // The first IEEE CSS Video Clip Contest [Digital resource]. – URL: <http://www.ieeecss.org/video-contest/submissions>.