The Evaluation of the Impact of the Teaching Movies on the Level of the Students' Knowledge

A.Bluma[a], I.Klincare[b], J.Blums[c]

Institute of Technical Physics, Riga Technical University, 14/24-322 Azenes str., Riga, LV-1658, Latvia

[a]anzelika.bluma@rtu.lv, [b]klincare@latnet.lv , [c]blum@latnet.lv

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Abstract. The impact of the independent students' work on the digestion of the university physics course is under investigation. Different teaching materials for physics course inter alia teaching movies are available for all students in the common university electronic platform. In each teaching movie some experiments devoted to the one physical phenomenon are showed and processes taking place are described. The created electronic platform is able to control all activities of users of teaching materials: time, frequency and duration of usage of each material. In this investigation we try to compare and analyze test answers and grades of students who have watched movies with ones of students, which do not watch them.

Introduction.

Investigations of e-learning process are under interest so the goal is to make the study process flexible and individual [1]. It is shown that blended learning includes all preferences of distance learning and full-time study process due to possibilities of efficient use of contact lessons together with unassisted studies of the offered electronic teaching materials [2]. One of the attractive forms of materials in different data bases are teaching movies [3]. There is a possibility of effective combination of a theoretical material with practical experiments and explain a physical and technical basis of processes in these movies. As a result is that teaching material becomes more interesting and understandable.

During last years at the Riga Technical University (RTU) in many disciplines, as well in Physics, the number of contact lessons was diminished, and with the goal to improve the knowledge of students and to compensate the lack of contact hours has been realized a project "Elaboration of Multimedia Teaching Materials for Engineering Education in Mathematics, Material Science, Physics and Chemistry" (financed through EU funds). In the frame of this project different types of materials were worked out (topics of lectures, videopresentations of lectures, animated examples of problem solution, teaching movies, description of laboratory works (both textual and videopresentations) and tests for students' self-control). The principles of these materials have been reported before [4, 5].

The goal of the current investigation is to elaborate the evaluation procedure for analyzing of the impact of teaching movies to the students' knowledge. The results of the tests have been compared for students with 6 credit points (CP) Physics course (namely, 6 contact lessons per week) with 8 credit ones. Also the activity of students in using of the electronic materials is taken into account.

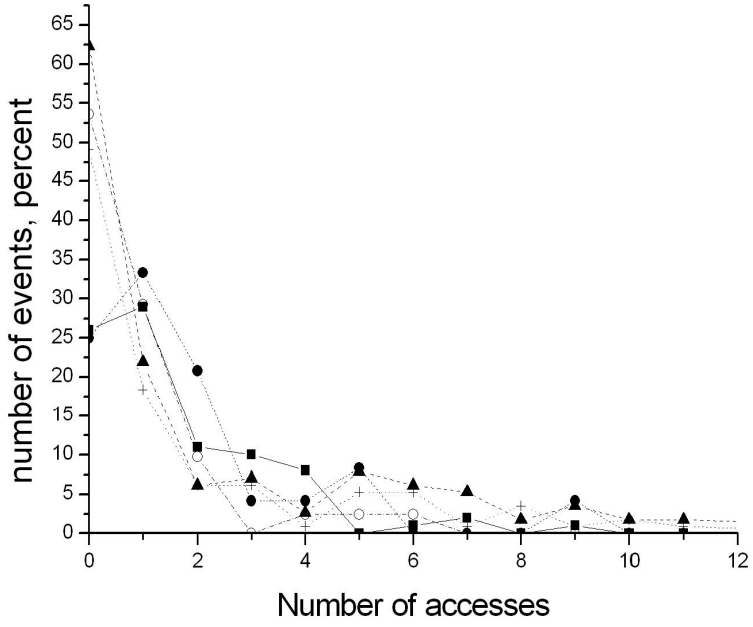
Method of investigation

To assess the developed teaching material quality and usefulness of the study we used two methods: Two tests in each semester were given to students within two years. Test questions were drawn up so that the right answer would be found in the training films created by us and available for students at the electronic platform of RTU. Two task groups were selected, one of which studied physics courses at 6 CP program, the other - at 8 CP programs. Overall, the results of 8 tests were analysed. In the this research were analysed the correlation between obtained test mark and the activity of the students in educational film viewing, defining can movie watching helped to give the correct answer to test questions. The obtained results are summarized in Fig.1.

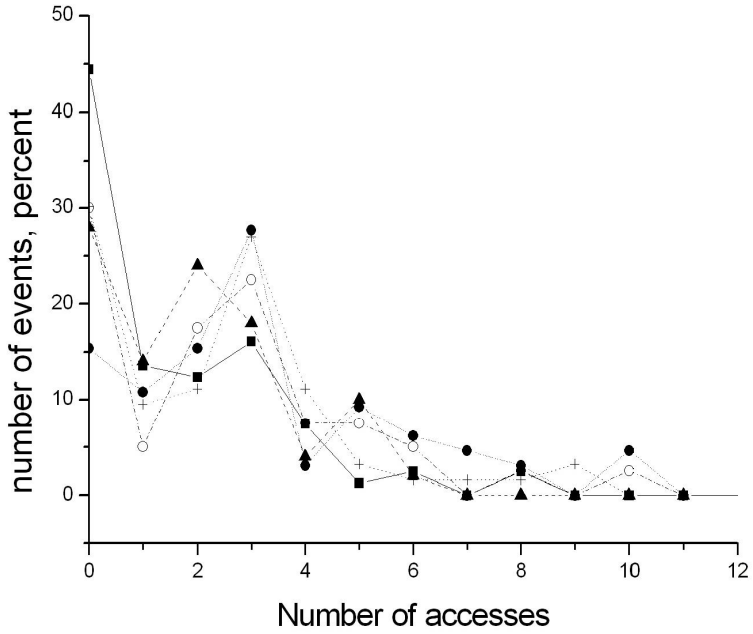
In the same study groups at the end of the school year the survey was organized to determine which of the available on-line learning materials students use most often and what is the students' opinion on the material quality.

Results

The analysis of the test results. The Fig. 1 shows the overall results for both study groups (244 students) for two semesters.



a)



b)

Fig.1. *The number of obtained marks as a function of number of accesses to on-line movies; a – 1st semester; b – 2nd semester. ■ – mark 0; ▲ – mark 1; + - mark 2; o – mark 3; ● – mark 4.*

The number of obtained test marks (from mark 0 - completely wrong answer to 4 - completely correct answer), as function of the access number to corresponding movie is shown in the Figure.

This approach, of course, does not determine how closely movies are studied; in addition, movies can also be downloaded to your computer and then see several times.
Charts show that all results has one trend - the higher the rating, the lower the number of students who are able to obtain it, without watching of training films. In both semesters the number of students who responded almost correctly (mark 3) and accurately (mark 4) without watching movies is less than those who got their marks after watching training films (1 - 2 times in the first and 2 - 3 times in the second semester). The drop of the marks in the 2nd semester at one viewing time is observed (see Fig. 1, b). Those who watched training films for a one time, has got a lower rating than those who did not look at movies in general, and those who watched films 2-3 times. A non-serious approach to training films, same as for entertaining videos, can be the reason of such drop.
It should be noted that during the learning process student obtains information from different sources (lectures, textbooks, Internet resources, consultations and discussions with teachers, fellow students, etc.), therefore, during the analysis of one source (in this case, one type of available in electronic learning platform resources - training films), the dispersion of results is large, because the same information can be obtained from various sources. It also can be seen from the results (see Fig.1) - a significant proportion of students (25% and 15% in correspondingly 1st and 2nd semester) correctly answer the questions, without the access to the educational movies. However, the results indicate that educational films are useful information and knowledge sources.

The analysis of survey results. Overall, 107 students from task groups were interviewed at the end of the physics course, but before an examination. Students answered on questions about rate of use of teaching materials and the need for such educational resources, and evaluated the material quality. Responses (see. Fig.2) show that the greatest part of interviewed students has used materials for laboratory work (99.7% - work descriptions and 92.52% - videopresentations). This situation is attributable to the need - laboratory works were carried out during the semester, and teachers regularly check students' readiness.

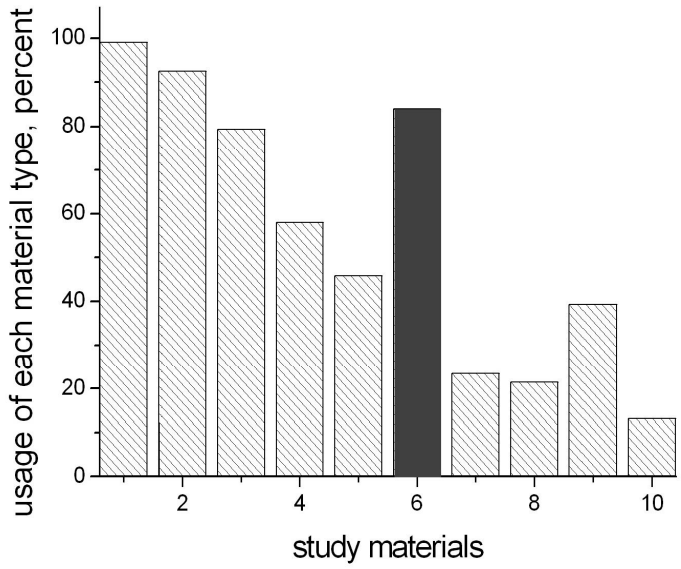


Fig.2. *The usage of each type of study materials: 1 – description of laboratory works; 2 – videopresentations of laboratory works; 3 - topics of lectures; 4 – videopresentations of lectures; 5 – videopresentations of problem solving;* ***6 – teaching movies;*** *7 – tests for lectures; 8 – tests for problems; 9 – tests for laboratory works; 10 – do not use on-line study materials at all.*

Topics of lectures (79.44%) and lecture videopresentations (58%) - mostly used, but not as intensively as materials for laboratory work. Videopresentations of problem solving are used by nearly half of the respondents (45.8%). Analyzing the results of the proposed self-test use, we can see the usage drop (23.4% - the lectures tests, 23.5% - tests for problem solving and 39.3% - tests for laboratory work). Unfortunately, this suggests that a great number of 1st year students are not

ready for the independent work that requires effort. To answer the test questions, students have to think up seriously, but other materials can be just passively observed. Ranging answers in the frequency of usage we can conclude, that students use videos as ancillary source of information to the printed teaching material, again at the head are the descriptions of the laboratory works - the most requested and checked by the teacher. 72.9% of the respondents most often used laboratory work materials - again, it was continuously required during the semester! Analyzing students' survey responses on training films we can see that 84.2% of respondents were watching training films. Mostly, it was done after the teacher's reminder before the test (57%), few of students did this regular (14%) and 24.3% watch movies not most at once a month. So, obvious conclusion is that the teacher must regularly encouraged the use of learning materials by first year students and can not rely on the confidence in their own work.
The quality of the movies the majority of respondents assessed in the five-point scale well (on 4 and 5) (75%), but the reasons why movies are not watched were very different – mostly not the technical problems with internet access and the electronic platform of University. Technically everything was guaranteed at a sufficiently good quality and can be used in the future.

Conclusions

Training films are one of many sources of information used by students during the study process. Several different cognitive material usages in the study process are very desirable because it allows matching individual students' learning type, capabilities and interests. On the other hand, it also requires a differentiated approach to studying because the transition from passive information collection forms (lectures), to the active learning (an interactive learning environment, training films, tests, etc.) takes place. Our research had shown that such active learning - constant, systematic and unassisted using of teaching resources in many cases is too difficult for 1st year student due to the lack of the experience of the independent work.

The analysis of the activity of educational film viewing and the resulting markup showed that teaching movies can serve a good source of information for the investigation of various physical phenomena and processes.

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