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# E-learning and Evaluation in Modern Educational System

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Implementation of information and communication technologies as well as emersion of new user interfaces and web 2.0 technologies changes the way of education system, the way of living and business transactions in general. The way we communicate, operate, produce and live is also changing. In accordance with it, the systems of education change from traditional to modern. The following changes occur: from content delivery to knowledge production, from transfer of knowledge from teachers to students towards encouragement of development and construction of knowledge, from courses and programs changing to the adaptation of the study environment, from the faculty professionalism to the quality of teaching and student learning and the early involvement of students in research work and projects. These occurring changes also affect the students' and professors' mobility. Here, the word "mobility" represents not only the student exchange programs and the easier transitions from one's home university to a foreign one, but also the way professors conduct their classes. With the development of certain software, students' class attendance no longer represents an important factor, as they can now learn from distance using the mentioned software, taking the learning process one step further. In order for above-mentioned changes to occur, the use of e-learning and the development of new tools are almost mandatory. With this in mind, the goal of this paper is to analyze quantitatively the changes that are occurring almost every day that affect the students' learning and the professors' teaching methods.

*Keywords:* e-learning, cone of learning, education, evaluation

## Cone of Learning

Confucius, the famous Chinese thinker and philosopher, once said, "I see and I forget, I hear and I remember, I do and I understand". We all know this instinctively, but perhaps Edgar Dale, a US educationist at Ohio State University, explained it the best. He studied inter-relations of different audio-visual materials and their positions in learning processes and expressed the divisions based on extreme two points between direct experience and pure abstraction. His study was experience-based, as he conducted his research based on the experiences he got from his own students.

What he did was trying different teaching methods on each student group. After two weeks, Dale tested their knowledge. The results showed a significant deviation between different learning methods. Dale could divide those methods into passive and active learning, and each of them into a nature of enrollment, as reading, looking at pictures, seeing a movie, giving a talk or doing a presentation. The data showed that in active learning, his students performed above average.

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The results indicated that, after two weeks, the student group that learned from reading remembered only about 10% of what was written, while the student group that learned from watching a demonstration or an exhibit remembered 50%, and the group that actually did the real thing or simulated a real experience remembered an astonishing 90%. These results are illustrated in Figure 1.

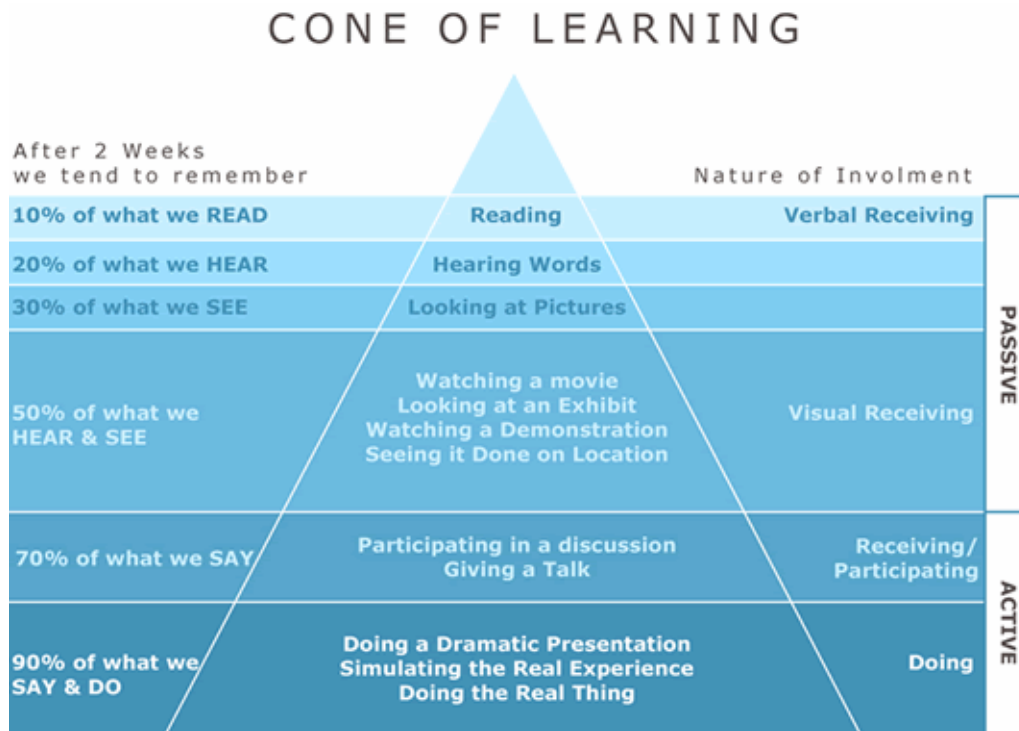


Figure 1. Edgar Dale's cone of learning. (Dale, 1969)

Moreover, students who remembered by reading or hearing were able to define or describe the things they remembered. Students who remembered by hearing and seeing were able to apply what they learned, but only those who learned by saying or saying and doing could analyze, evaluate and criticize what they knew.

### Applying the Cone of Learning

There are several problems in the used learning methods, which can be grouped in three categories: (1) The first one is the problem of exponential world knowledge growth, which makes prompt adjustment and fast fact acquiring the key of success (Potts & LaMarsh, 2004). Despite the quicker adapting that is nowadays required, the majority of the learning institutions still rely on the old fashion way of information transmitting (Birenbaum et al., 2006). Students are taught the information which is complete and static, and are encouraged to absorb the materials rather than challenged to come up with a better solution; (2) The second problem is resulted by an inadequate course evaluation, as the rapid industry development is rarely in correlation with the study program development. This results in a less than perfect educational providing; and (3) The third problem is the gap between the knowledge that is taught in the universities and the knowledge that is expected from students in a job position.

It is common for excellent students to perform less than excellent in their jobs, and vice versa, for students who struggled their way through school to have admirable success in the work environment. This alone is a proof of the differences in the ways of thinking that are learned in a universities and the way a person is

expected to perform a job.

In order to bring a solution to above-mentioned problems, changes in the teaching methods are inevitable. A student's main goal has to become to acquire knowledge he/she will most certainly need, rather than to obtain a diploma; and this can be done by adapting the learning environment to match a working environment.

### **Adjusting the Learning Methods**

The determination on basing the learning system on methods used decades ago, ignoring the exponential growth of technology and the changes that come with it, will lead only to a more traditional system. Science, people and technology are changing too rapidly to follow them using the traditional teaching methods. Thus, only new and innovative learning methods can make a difference. In the University of Zagreb, Faculty of Graphic Arts, there are several courses where the professors are determined to solve or at least to ease those problems by adjusting the learning methods to match Edgar Dale's cone of learning by e-learning. By using e-learning, it is hoped to achieve changes in the way of thinking and learning and to shift from a vertical hierarchy to a horizontal one, where professors and students can call each other colleagues, thus, referring to one another as practically equals, emphasizing the idea of a common goal—innovative learning. Moreover, it is hoped to shift from defined course materials years or even decades ago to an adaptive learning system where students get to choose the topics they would like to explore further. By giving them this option, Dale's cone of learning is being implemented, and doing research by themselves and presenting this research in front of the whole class will help them remember it much better than they would have if a professor just made them learn it. Those implementations would most likely lead to a change in the learning system. Students' knowledge will no longer have to be acquired by merely professors' lectures that will then be expected to reproduce, but by reproducing a knowledge based on experience. It is needless to say, not only this knowledge would be much better understood, but also the students will remember it much longer and much better.

### **E-learning**

Learning is a process of achieving certain competences that can be defined as a dynamical combination of cognitive and meta-cognitive skills, knowledge and understanding, as well as the development of social skills and growth in ethical values. The target of every educational program should be to enable its participants to have an optimal balance in developing all the above. The system itself should be directed to its participants and the results they achieve. In the academic environment, this calls for a need of overcoming the situation, in which the educational program is often a reflection of the professors' interest and expertise areas.

E-learning enhances the quality of educational process by enabling the practice of new roles in the process of learning. In addition, during this process, lifelong learning technologies are used.

There are different forms of e-learning: (1) ICT (information and communication technologies); (2) mixed learning as a combination of classroom teaching and teaching over the system; and (3) learning at distance. When choosing a form of e-learning, one should have in mind the type of the course it should be applied to as well as the needs and possibilities of students and professors.

E-learning should not be seen as an alternative educational system but as an enhancement of the existing one.

Today, we are faced with a new generation of students, and the aberrational characteristics present among them in comparison with the older generations are only going to be more emphasized with the upcoming ones. The new generation of students are capable of fast information adoption and multitasking, and they call for a random access to information ("anytime, anywhere"), as they are accustomed to Google-like informational

systems and multiple media operating. They expect to be rewarded at all time.

Past educational systems were based on the idea of delivering the knowledge to students who accepted the given knowledge in a passive manner. Professors played the role as keepers of the knowledge. The individual effort was valorized. This kind of model is unacceptable to the new coming generation of students and is not in concordance with the situation waiting for the diplomats in their future working environment.

Through e-learning, a new educational environment can be set and an environment can be constructed in the direction of interaction, processing information, researching and problem-solving. The students are asked to actively get involved, and often work in teams. The role of the professor is to design the methods of learning and help the student develop their talents and capabilities. As cooperation is one of the main characteristics of this model of learning, in contrast to prior plain subjection to professors' authority in a one-way system, even the evaluation part of educational process is done in congregation.

### Survey

In order to evaluate the e-learning system on practical level, the short survey among 40 students was managed. It is important to note that the survey was performed after the last class of a particular course and that it was anonymous. Students were asked to put real thought into answers and be truly honest. Questions and their results are shown in Figures 2, 3, 4 and 5.

Figures 2 and 3 confirm Dale's cone of learning theory. It is visible that the largest amount of information is remembered when doing practical exercise, and the least when reading plain text. PowerPoint presentations also help students memorize lectures, which is understandable, since the presentation has the element of interaction between the audiences and the lecturer.

Video materials also help maintain the concentration. Therefore, as new educational approach provides students' self-involvement in creating of lectures, it also results in greater information absorption.

When finally the question "Do you think e-learning is more gainful than conventional way of learning" was asked, 83% of students said "Yes" (see Figure 4). When facing this new system for the first time, students were a bit confused, since they have not faced that approach of learning before. There were some questions about lecturer's expectations, but after a while, students adopted this new way of information sharing and learning. Also, after taking a class, they were able to point out the advantages of e-learning system in comparison to conventional one (see Figure 5).

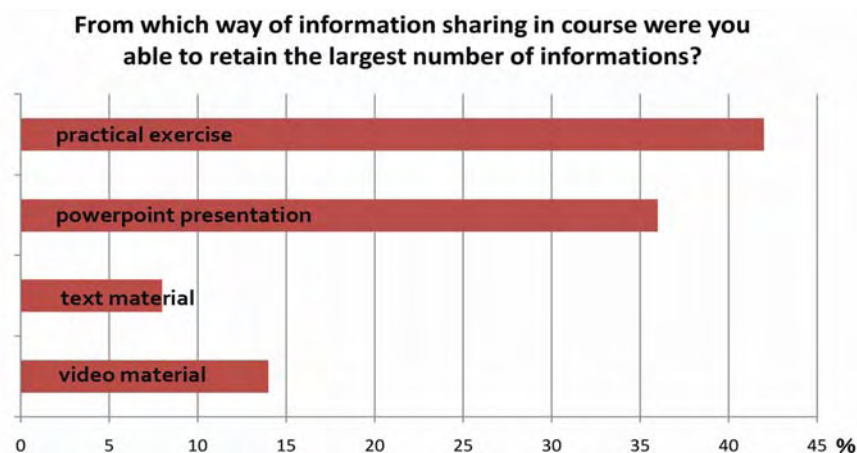


Figure 2. Information retaining in different types of their sharing.

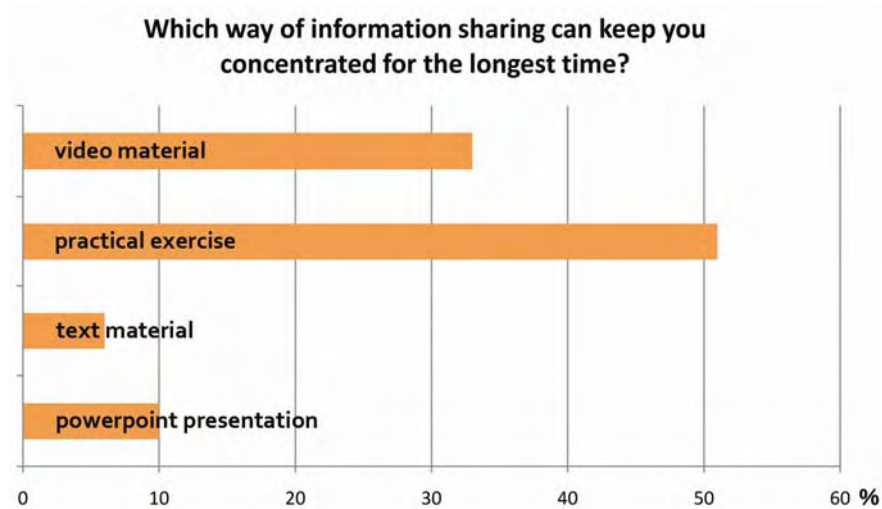


Figure 3. Duration of concentration in different types of information sharing.

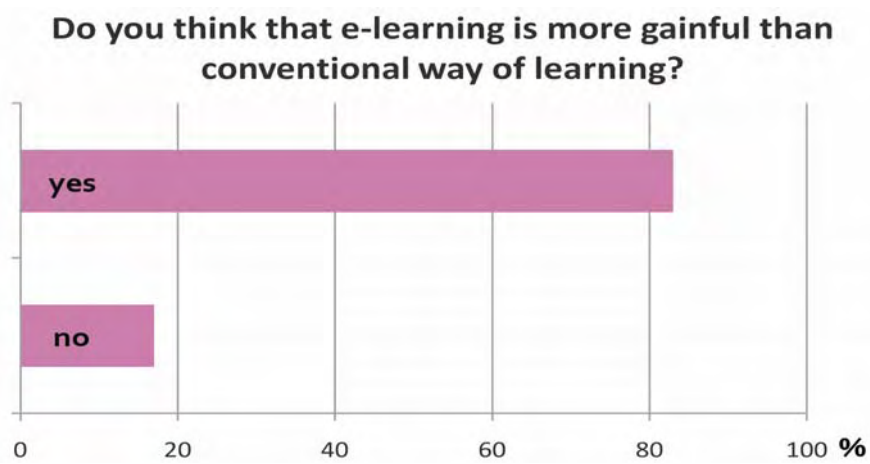


Figure 4. Evaluation of e-learning.

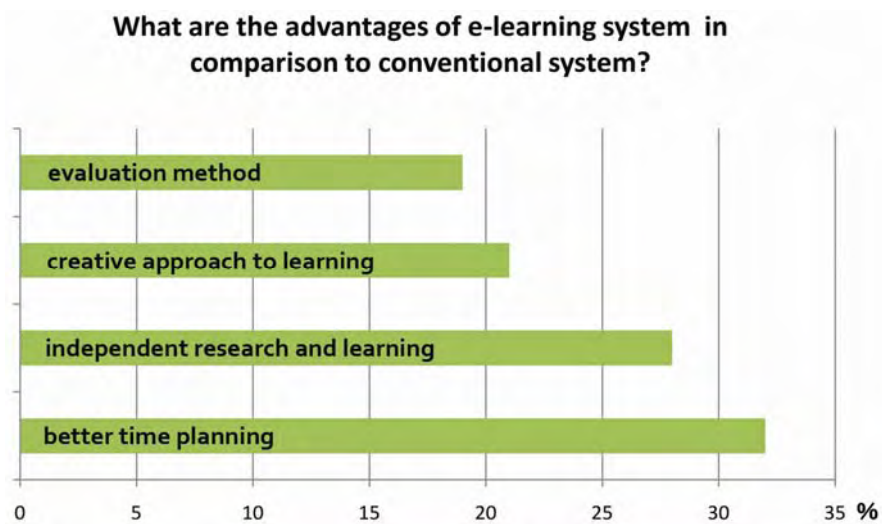


Figure 5. Advantages of e-learning.

### Conclusion

According to the survey results and the cone of learning theory given by Dale, it is obvious that the way of learning in a modern educational system should be improved. Not only the technology has developed in past 10 years, but the general lifestyle, too. Informatization gives new options for performing some tasks, simultaneously adjusting the performance of students. E-learning provides direct students' involvement in planning and development of the class. It also gives a motivation to students and professors to improve their work and communicate in order to express their opinion and give creative advice on how to make particular course more interesting and pragmatic. Including video materials and lots of practical exercises for students enables them to learn and memorize up to 80% more information than they do when just reading or listening, whilst giving them an opportunity to make their own schedule of managing given assignments.

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