

# Digital Learning Environment: Experiences from Using video in Learning Process

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**Abstract**—Most teaching situations are relatively traditional and based on teaching in a classroom environment. Despite this, modern technology has gradually become a part of the learning process. Managing schedules, registers and communication between teachers and students are all relying on information technology. Furthermore, digital learning environments are important part of courses, providing learning material and exercises for all participating students.

The actual teaching situation can still be a lecture taking place in classroom, where students are expected to be at a given time. Here we discuss the experiences from using video as part of the learning process. Clearly, video allows students to participate even if they have difficulties in attending lectures. If teaching is being recorded and archived preparing to exams, or checking how a difficult learning issue was clarified during lectures becomes possible. For the teacher video recording does not have to become a burden or require additional efforts. Our experiences are promising, and suggest increasing the use of video in learning situation.

**Keywords**—Video, learning, learning environments, process.

## I. INTRODUCTION

Traditionally, it has been assumed that learning takes place in a classroom in presence of a teacher. Obviously, the also other settings for both learning and teaching. Classroom-based education, with lecturing as a teaching method are still widely considered as the basic setting for providing education. However, different group-based learning approaches where teacher is seen as a motivator are gaining ground.

Modern learning environments allow learning at each learner's individual pace and differentiated, individualized learning. Furthermore, learning environments can support learning together with fellow students, cooperation and interaction with others. [1], [2], [3]

In this article we look at modern learning environments that use technology as part of the learning process. The role of technology can become a critical part of the learning experience, here we look at the use of video in learning based on experiences from University of Turku.

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## II. TECHNOLOGY IN LEARNING

Traditional classroom-based lecturing does not necessarily use technology. If teaching is based on lecturing chalkboard might be among the only technologies that are needed. However, today students expect some level of modern technology also in education. For example, learning material should be available and accessible with a computer. The communication between students and educational institutions, teaching staff and fellow learners takes advantage of electronic mail or other similar applications. There is simply no return to days of chalkboard.

Technology is today used widely in different fields and activities, and this is the also the case in education. It is normal to expect that courses, curriculum and education in general takes advantage of modern technology, computers and networks. This has prompted educators to pay attention to the learning environment, and the way technology is used in this context.

Development of modern learning environments is typically based on ideas of

- Personalised learning, meaning that all are individuals when it comes to learning. No two individuals can have the same prior knowledge, making the learning process unique for each learner. Here we use the term differentiated learning and emphasize learners' prior knowledge, individual requirements for learning content, pace, learning challenge and contextual factors [1], [4], [5]
- Teacher is not the sole activator of the learning process. In fact, it has been noticed that when a person initiates an exploration - or learning - by himself the results tend to be better than in situations where the start is not equally natural and self-guided. When learning is initiated by the learner it is a matter of internal motivation that is the driving force. [6]
- Social nature of learning: collaboration in learning and peer-based tutoring are important elements in the learning process. Often studying together with other learners makes it possible to gain deeper understanding of the object of study. [7], [8]
- Learning takes place also outside classroom. For example, learning about pond ecosystems is more powerful if students visit a pond and not rely on learning about them only in a classroom or from reading textbooks. [9] As a result, the environment is a part of the learning process.

Information technology has an important role in different stages of the learning process. It allows learning to take place anywhere and anytime. Especially for adult students this may provide flexibility to learners, and remove barriers that make education challenging at a later age. For example, mixing work and family with learning becomes possible in ways that were hard to organise in education that is based on attending lectures in a classroom. Modern learning platforms make it possible to access different type of learning material like slides, lecture notes or even video-recorder lectures whenever needed.

There is a need to develop learning environments that make learning easy and straightforward. Technologies and applications need to be robust and easy to use, and they should support studying in learner's individual pace and style, cooperation and learning together with other learners. This makes it possible to modify content, process or products to meet the needs of different learners. [1], [2], [10]

It is noteworthy that learning environments are increasingly based on technology, and this requires the learner to master technologies, especially computers and networks, and to have skills and knowledge in using various applications and systems that are needed in the learning process. The requirements go beyond skills in individual technologies or applications, it also calls for basic understanding of digital infrastructure, computers and networks together with the ability to work with files, web-browsers and various productivity applications. Also video-based education calls for technical skills, for example working with audio and video can sometimes be challenging. When the screen goes blank or there is no audio one has to change computer settings, restart applications and do other similar activities in order to be back online

### III. VIDEO IN ACTION

Audiovisual recording, or shortly video, is technology that has been around for years, However, using video for educational purposes is not as common or widespread as it could be. The driving force behind video-based education is providing access to education from a distance, and to break the idea of having to physically be in a given location at a predefined time. Ideally, video can bring added value for student having difficulty to attend classroom-based lectures. It also makes it possible to providing a richer variety of teaching methods.

If one looks back video-based teaching has required cameras and recording devices, often studios with optimized lighting and audio. This is also the case today, but the technologies, recording devices and editing applications are not as expensive, large and bulky than back in the days. Recording devices are far lighter, smaller and can easily be carried from one location to another. One of the key features of video technology is that it is easy to operate. Clearly, the widespread use of mobile phones, and later other mobile devices like tablet-computers has made making videos and

using them from all kinds of purposes a common thing to do. Recording is fast and straightforward, yet the results are usually very good even in challenging conditions, even with automatic camera settings. Compared to technologies available few years ago the difference is significant, now good quality video can be produced without expensive, hard-to-use devices which required expert knowledge in camera and video technologies. It is also possible to capture video with mobile devices like smartphones and tablets, and upload the videos for further reproduction on sharing. In both cases video can also be streamed online directly to the audience.

One of the challenges in using video for educational purposes is that there are many interconnected stages in video-production ranging from technologies, systems and stages in recording, reproduction and delivery of the content to learners. From the video production perspective, it may be overwhelming to manage all stages and phases, and therefore it has been demanding to persuade teaching staff to adapt video for teaching purposes. It takes extra time and resources, and requires a certain level of skills and expertise in technologies and systems used in video-production. As a result, straightforward and easy-to-use video-production systems are needed

### IV. THE PILOT PROJECT

Let us look at video-production based on experiences from pilot course at University of Turku, faculty of business. The solution is based on Echo360®. It is a web-based service where the user interface is a browser. There is no need for installation of applications or special software in the client device. At our university Echo360 has been implemented as a part of existing digital learning infrastructure. The added value here is that it integrates seamlessly into Moodle which is our main learning platform. Moodle allows implementing Echo360-modules into Moodle courses, for example. This creates an integrated learning experience for the student, there is no need to login into other separate system. Instead, content created with Echo360 is readily accessible directly from Moodle course.

In the pilot course video-production is possible directly from a classroom. There is no need to make the videos in a studio or other special environment. On the other hand, it is also possible to produce videos using a personal computer, laptop or even a tablet. This gives the producer (in this case teacher) possibility to make videos at the office or at home, or record teaching directly from the classroom. Purpose is to make recording straightforward so that lecturer can make recordings and produce video material without need for expert advice or support staff. Despite this, implementation has been thorough and there are resources for supporting teachers in their video-production. Ideally, the system should be easy to use so that there would not be technical barriers in video-based education.



Figure 1. Echo360 running in the classroom

*Echo360 turns the devices they use from distractions into learning assets. By pulling classroom content, lectures, social learning tools and resources into one connected digital environment – students are able to seamlessly interact in new and exciting ways whether it is in a traditional, hybrid or online class - See more at:*

<http://echo360.com/#sthash.8oHQ6Vpq.dpuf>

Echo360 provides even more than tools for video capturing and broadcasting. It also gives information on student behavior. There are features that enhance interaction in the classroom.

*Echo360 brings new levels of engagement and visibility to the daily learning moments – those moments of learning that occur while taking notes, asking questions, reviewing lectures, building study guides, flagging confusing content or discussing topics with peers. - See more at:*

<http://echo360.com/#sthash.8oHQ6Vpq.dpuf>

Assessing teaching results, and understanding whether students are progressing as planned, or is there confusion or misunderstanding has always been an important element in the learning process. Teachers have limited ability to verify whether things are ok or not, often this information will be available too late, after a test in the middle of course or after the final exam. In most cases it is not possible to arrange several tests during the course, and if these reveal misunderstandings or other problems weeks or months earlier there is little that can be done. What is needed is real-time data on what students actually are doing as course progresses, and especially identifying those who are struggling and in need of supporting actions would be important.

Echo360 supports changing teaching practices from lecture-based teaching to more engaging methods. For example, flipped classrooms are easily organized, as the lecturer can record, edit and assign instructional videos already before the classes. This can be done from home or office, or actually from any location with teachers own computer. Secondly, the

teacher can track which students have looked at the videos and are ready for discussion. The idea is that all, or at least most students have familiarized in advance with topics so that these can further be discussed in classroom. Third, the participation can further be improved by using polls, quizzes and similar activities, like group work assignments.



Figure 2. Camera at the back of the Echo360-classroom

In real teaching situations Echo360 is very transparent to the lecturer. Typically, the lecturer checks that system is on, audio/video is being broadcasted and recorded. Relatively the teacher forgets that there is a video recording going on. However, in our case the lecturer cannot move that freely in the classroom because there are microphones only in the front of the classroom and a fixed camera is pointing only to one location.



Figure 3. Stage - ready for recording

There are also other problems with the system. The developer of Echo360 claims it allows interaction and engagement. This may be true when it comes to interaction outside actual lecturing phase, but in a real teaching situation the lecturer has practically no possibility to interact with students accessing the course from a distance. The experience shows that when lecturer is engaged with teaching there is no time to check whether there is a question or comment placed by virtual students, for example. However, after the live act it is easy to answer the questions and place comments on top of

the recorded video.

What we noticed is that even though the system makes it possible to interact with students it is not possible in real life. When experimenting with a helping teacher this is possible, but there are hardly resources in a normal teaching situation to have to staff members present in a classroom at the same time. In a seminar or other special occasion this can be better arranged, but hardly in normal courses. Another remark to interaction is that if there is input from the audience and this is noticed, answering would require the lecturer to sit down and type behind a computer terminal. Obviously, this would interrupt teaching quite badly. As a result, we found that interaction with audience might be possible and sound like a good idea, it is not so easy to realize in actual teaching situations

## V. CONCLUSION

Technology can be used in many ways in the learning process. It allows flexibility to learning, and makes it possible to study independently of time and space. Modern learning environments need to be robust and easy-to-use. There is need for basic skills and knowledge in technology so that one can manage the technological environment.

In this article we describe experiences of video-based education. This is a pilot case where we describe how video is being used in a single course at our university, at the faculty of business studies. In other faculties, disciplines and courses technology may be applied differently, and it may have other roles in the learning process.

It has become common to create modern learning environments where learning material is available at any time. In this way students can access the material, exercises and related material whenever needed. While most material may be slides and articles in digital format, part of the material consists of video-recordings of classroom based teaching. Having the possibility to later view these recordings makes it possible to experience almost similar teaching experience than in a real classroom situation. For example, when preparing to exam it can be valuable to check key-topics that are explained in detail by the lecturer in the video-recording. Furthermore, video-recordings may also be shorter clips about a given title, phenomena or other topic. This does not mean that there would not be need for lectures, seminars or exercises that take place in real classroom situations. Recordings are an additional benefit, they can be recorded to video and then stored to the learning platform for later access. It is noteworthy, that using video gives the learner the possibility to proceed at individual pace and speed, and do this when is the most appropriate time to study.

In many courses the role of technology is not that significant. Based on the experiences in our faculty majority of education is based on traditional lecturing. However, experiences indicate that digital learning material, such as video-recordings bring added value and flexibility to the

learner. From the lecturer's viewpoint there is no added workload if recordings are made directly from live classroom teaching situations. However, should there be video recordings that are specifically made for the learning platform (and not recorded as a by-product from lecturing) the added amount of work could be significant.

In general, there is a shift in universities and schools towards modern learning environments, allowing access to learning material whenever and wherever. [11] Digital learning material can diversify the learning experience, and make education possible for learners who have difficulties in attending lectures in a traditional classroom. Here video-based material is one of the formats that makes this possible. In this way technology can bring flexibility to education

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