EVALUATION OF EPE VIDEOS IN DIFFERENT PHASES OF A LEARNING PROCESS

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ABSTRACT

The goal of the paper is to present possible use of EPE videos in different phases of a learning and teaching process. The paper is based on an evaluation of EPE (easy production educational) videos. The evaluation framework used in this study, divides the teaching and learning process into four main phases: 1) The preparation phase, 2) The learning activities, 3) Follow up work and 4) Assessment. The evaluation of 132 EPE videos shows that the videos mainly are used in the preparation phase and/or as part of the learning activities. Videos used as part of formative or summative assessment are rare. The paper presents an illustration, which provides an overview of pedagogical use of educational videos, based on the four learning phases. Our findings show that all pedagogical opportunities concerning EPE videos still are not extensively used.

1. INTRODUCTION

The interest in short videos used for educational purposes, called EPE (easy production educational) videos is increasing. The definition of an EPE video is a pedagogical video clip (lasting up to 5 minutes) produced by the use of "low-effort" video equipment like mobile phones or small cameras. EPE videos should have a pedagogical purpose and be used in a pedagogical context. The goal of the paper is to present possible use of EPE videos in different phases of a learning and teaching process. The learning and teaching process is divided into four main phases: 1) The preparation phase, 2) The learning activities, 3) Follow up work and 4) Assessment. During the preparation phase, one motivates and raises interest in the learning objective(s), and the students prepare for the next phase. The next phase is traditionally connected to the classroom situation, where the teacher has prepared for a variety of learning activities, e.g. presentations, demonstrations, collaborative learning activities etc. During the 3rd phase "Follow up work", the students continue the work, e.g. through homework. The 4th phase includes both formative assessment (assessment for learning) and summative assessment (assessment of learning).

There are a variety of examples on how to use videos in the classroom, e.g. students watching films/videos, which presents a specific topic (Torgersen, 1998), active viewing of films (Newby et al, 2006), teacher recording classroom interactions e.g. the Marte Meo Method (Axberg et al, 2006), student- or teacher-generated videos e.g. digital storytelling (Lambert, 2009; Høiland & Wølner, 2007; Olsen & Wølner, 2003) and "low effort" use of mobile video technologies in the classroom (Kolås et al, 2011). Outside the classroom, videos can be used for e.g. preparation, using Khan Academy (http://www.khanacademy.org) or through methodology like "the flipped classroom" (Bennett et al., 2011).

The technology and software necessary to create, edit and present educational videos are widespread. Both teachers and students usually have access to a mobile phone camera, which can be used for recording educational videos. 90% of all Norwegian children aged 9-16 have their own mobile phone, and 97% of all Norwegian children aged 13-16 have their own mobile phone (Norwegian Media Authority, 2010). The Norwegian Monitor (Hatlevik et al, 2011) found that 75% of 13 years old children, 81% of 15 years old children and 86% of 18 years old Norwegians use their own computer at home. 99% of 13 years old children, 98% of 15 years old children and everyone at the age of 18 have access to a computer at home. Editing software e.g. Windows Live movie maker, screencast software e.g. Screencast-o-matic.com or CamStudio

and publishing services like "YouTube", are free and widely accessible. This is a good starting point for the use of EPE videos in a pedagogical setting, as the technology is already in their pockets or on their computers, and many of the students and teachers already are familiar to technology.

The background of this paper is connected to two projects; "Nærproduksjon av video" (Developing EPE videos) 2011-2012, a national project carried out with the support of Norway Opening Universities focusing on how to produce and use EPE videos in teaching and learning settings; and "CoTech", an international NordPlus project on collaboration technologies in education across borders.

The structure of the paper is as follows. In section 2, we describe the methods, which the development of the evaluation framework is based upon. Then, a theoretical background of "educational videos" is provided. The next section briefly presents the evaluation framework before the findings of the study are presented in section 4 through figures and explanations. We then discuss the findings and present an overview of pedagogical use of videos in the fifth section, before the paper concludes in section 6.

2. METHOD

2.1 The Evaluation Framework

The evaluation framework for EPE videos was developed based on literature review, evaluation of student tasks and through prototype testing by an expert panel. First, the literature review covered international literature on educational videos, with focus on categories/types of educational videos. Secondly, teacher students in three countries (Estonia, Denmark and Norway) as part of the CoTech project, first performed a task of planning, recording, producing and publishing an educational video, then through a follow-up task peer reviewed each other's videos. Teachers from teacher education institutions in the three countries have assessed both the student videos and the students' peer reviews. The experiences of performing these tasks were important, as they visualized the needs of teachers who do not have experience of producing and using educational videos. Thirdly, an expert group was presented to a prototype of the evaluation framework that they tested on a variety of educational videos. The expert group consisted of ten persons with a technical and/or pedagogical background, who have experience with educational videos. The expert group's feedback was implemented into a new version of the evaluation framework.

2.2 Evaluation of EPE Videos

The evaluation was performed by 30 teachers/teacher students. They were told to find five educational videos, with the maximum length of 5 minutes, which they had used or would like to use in their classroom. During January 2012, the teachers and teacher students evaluated 4-5 educational videos each using the evaluation framework. 132 EPE videos were evaluated. The evaluation framework was available in digital form (through an online questionnaire), which was to be filled out, partly by free text, partly by the use of radio buttons and check boxes. To ensure a common understanding of all parts of the evaluation framework, the evaluation framework was introduced to all the participants using a "walk through" technique where the group evaluated the same educational video together. Any questions to the evaluation framework were discussed in the group to ensure a common understanding of the evaluation framework.

3. THEORY

3.1 Video Vitamins and the Flipped Classroom

Educational videos can change the structure of teaching. Rismark et al (2007) describe how the teacher in a biology course prepared "video vitamins" (short video productions) with the goal that the students would show up better prepared in class compared to using traditional reading assignments. The videos were made available for the students through their learning management system and the students used mobile phones to watch the videos. The teacher prepared a video of 4-6 minutes together with the university multimedia centre,

using "greenscreen" technology. An alternative method of using educational videos for preparation is the "flipped classroom" methodology (Bennet et al, 2011), which is an "innovative classroom structure that moves the lecture outside the classroom via technology and moves homework and practice with concepts inside the classroom via learning activities" (Strayer, 2007).

3.2 Formative and Summative Assessment

Formative assessment means assessment for learning (Harlen, 2006) and is used to improve a student's learning process and learning outcome. Examples of formative assessment techniques are peer assessment, self-assessment, formative tests, visualization of demands, criteria, and progress. Summative assessment means assessment of learning (Harlen, 2006), and includes tests, exams, portfolios etc.

3.3 Pre-, while-, post- Viewing Activities

According to Lehiste (2012), videos are powerful classroom resources when employed appropriately. In order to exploit videos fully in the classroom, she suggests integrating pre-viewing, while-viewing and post-viewing activities. Examples of pre-viewing activities are to predict the content of the video based on the title or some keywords, to ask true-false statements, to generate questions about the topic (which the video is supposed to answer), and to brainstorm. With while-viewing activities, it is recommended that students watch carefully, not to miss important visual clues. The video clip can be played more than once if necessary. While-viewing activities include work sheets (e.g. with questions that can be answered during the video clip is showed), tables or schemes that can be filled out (Lehiste, 2012). Torgersen (1998) describes four types of worksheet activities: Detail-oriented tasks, problem-oriented tasks, describing tasks and visually oriented tasks. While-viewing activities can also be performed through alternative viewing techniques e.g. silent viewing (watching a video clip/scene with the sound off), sound only (listening for aural clues to the actions), freeze frame (to point out parts of the video, to ask questions etc), backwards viewing and jigsaw viewing (student partners will each know different, but incomplete versions of a story) (Lehiste, 2012). Examples of post-viewing activities are summarizing the video in own words, answering comprehension questions, comparing, creating a mind map, discussing, role-playing etc (Lehiste, 2012).

3.4 Pedagogical Methods

Heinich et al. (2002) categorize pedagogical methods into 10 main categories: drill and practice, presentation, tutorial, gaming, demonstration, discovery, problem solving, simulation, discussion and cooperative learning. In *drill and practice,* the learner is led through a series of exercises designed to practice/improve existing skills. The method assumes that the learner previously has been introduced to the theme. Drill exercises should include feedback to reinforce correct answers and remediate errors that learners might make (Heinich et al, 2002). In the *presentation* method a source tells, dramatizes, or otherwise presents information to learners. It is a one-way communication controlled by the source (teacher, book, video etc), with no immediate response from or interaction with learners (Heinich et al, 2002). Using the *tutorial* method a tutor (e.g. a person or computer software) presents the content, poses a question, requests a learner's response, analyzes the response, supplies feedback and provides practice exercises until the learner demonstrates a predetermined level (Heinich et al, 2002). *Gaming* as a teaching method provides a playful environment where learners follow prescribed rules while working toward a goal. Gaming can be motivating, especially for tedious and repetitive content (Heinich et al, 2002). Alessi and Trollip (2001) define six game categories: adventure games, business games, board games, combat games, logical games, and word games.

By *demonstration,* the learner views a real or lifelike example of the skill or procedure to be learned. The goal may be for the learner to imitate a physical performance or to adopt attitudes or values exemplified by someone who serves as a role model (Heinich et al, 2002). The *discovery* method uses an inductive approach to learning: it presents problems to be solved through trial and error. The *problem solving* method confronts the learner with a problem situated in the real world and the learner develops, explains and defends a solution on the problem (Heinich et al, 2002). This study considers discovery and problem solving as one pedagogical method. Learning through discovery and problem solving requires that learners search for information. *Simulations* involve learners confronting a scaled-down version of the real-life situation. It allows realistic

practice without the expense or risks otherwise involved (Heinich et al, 2002). Different types of simulations are physical, iterative, procedural, and situational simulations (Alessi & Trollip, 2001).

As a pedagogical method, *discussion* involves the exchange of ideas and opinions among learners and instructor (Heinich et al, 2002). *Cooperative learning* involves learning together and learning from each other. Learners can collaborate, not only to discuss, but also by producing media (Heinich et al, 2002).

4. FINDINGS

The findings are based on the evaluation framework for EPE videos, which includes 24 questions. Theory and previous experiences are implemented into the evaluation framework. The evaluation framework focuses on five main topics: 1) Background information of the educational video. This includes name and duration of the video, where the video is published, subject and context of the video. 2) Added values of EPE videos. 3) Different types of EPE videos using different technology, genres, technical effects, cognitive types, modes and learning phases. 4) The pedagogical methods the EPE videos are based upon. 5) The student versus teacher productions of EPE videos. This paper mainly presents results from topics 3 and 4, focusing on the pedagogical methods and use of the EPE videos in different teaching phases.

4.1 Teaching/Learning Phases

The teaching/learning process is divided into four main phases: 1) The preparation phase, 2) The learning activities, 3) Follow up work and 4) Assessment. During the preparation phase, the teacher's goal is to motivate and raise interest in the learning objective(s), and the students prepare for the next phase. The second phase is traditionally connected to the classroom activities, where the teacher has prepared for a variety of learning activities, e.g. presentations, demonstrations, collaborative learning activities etc. During the third phase "Follow up work", the students continue the work, e.g. through homework. The fourth phase is assessment, and includes both formative and summative assessment. Figure 1 illustrates that most of the EPE videos were possible to use in the preparation phase and during learning activities, and a smaller number of videos can be used for assessment.
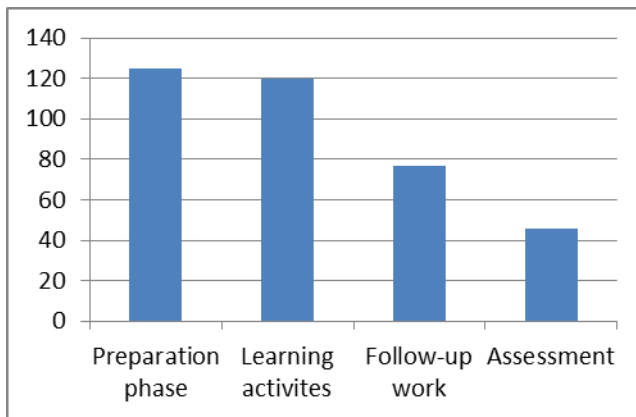

Figure 1. Number of EPE videos possible to use in the four different teaching phases.
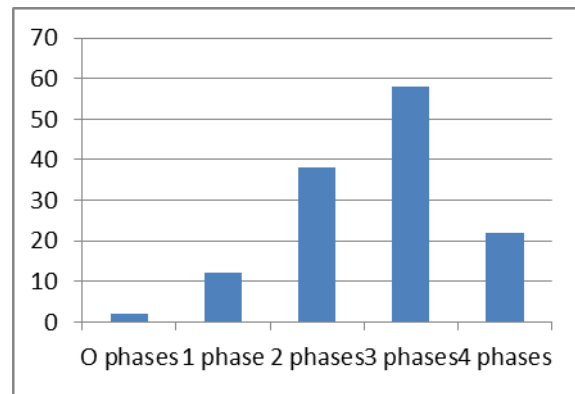
Figure 2. Number of EPE videos that can be used in several teaching phases.

The evaluation framework allowed multiple values to be filled in when categorizing the use of EPE videos into different teaching phases. Figure 2 illustrates how only 12 videos fit only one teaching phase. 118 out of 132 videos were described to fit 2-4 different phases and two videos did not fit any of the teaching phases. This means that many of the videos can be used in e.g. both preparation phase and phase of learning activities.

4.1.1 Preparation Phase

The evaluation framework asked about the intention of the EPE video if the video can be used in the preparation phase, and the results show that the main application areas in the preparation phase was to use the video for introduction and/or to motivate the students. Some videos were used to initiate reflections, while a small number of videos were used for reading support and/or as an artistic perspective to the learning goals.
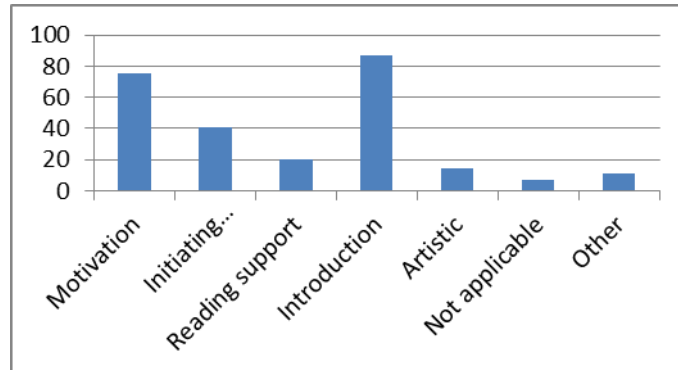

Figure 3. Application areas of videos used in the preparation phase.

The evaluation framework allowed multiple values to be filled in when evaluating the application area of the videos use in the preparation phase. 76 out of 132 videos were described to fit more than one of the categories for the preparation phase, which means that a video can be used for e.g. both motivation and reading support.

The "Other" category include explanations like "step by step instruction", "preparation before using a tool", "an example", "visualization", "introduction of a person" and "show the right technique".

4.1.2 Learning Activity Phase

The EPE videos used in the learning activity phase were based on different pedagogical methods. The main pedagogical methods of the EPE videos were presentation and demonstration. Few videos are based on the following pedagogical methods: drill & practice, exploration, simulation, discussion, collaborative learning and game-based learning.
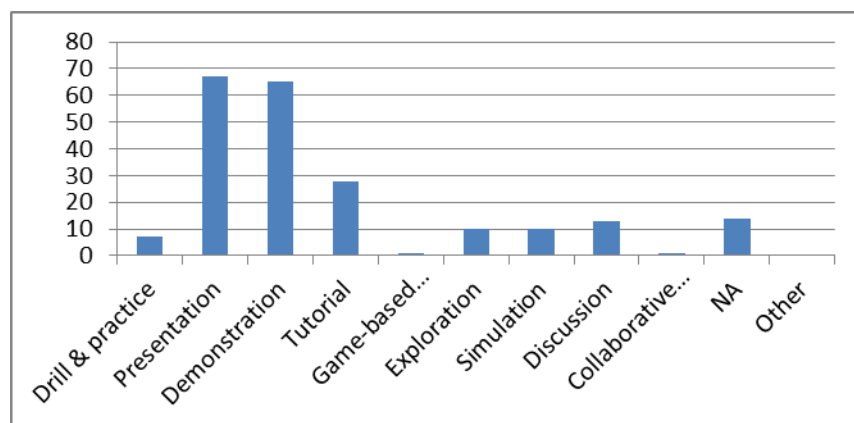

Figure 4. Pedagogical methods used in the EPE videos in the learning activity phase.

4.1.3 Follow up Work

The "follow up work" phase includes e.g. the use of videos for homework. The findings show that half of the EPE videos are used for repetition (figure 5), while some EPE videos are used to summarize the classroom's learning activities or to prepare for exams. 55 out of 132 videos were not possible to use as follow up work.
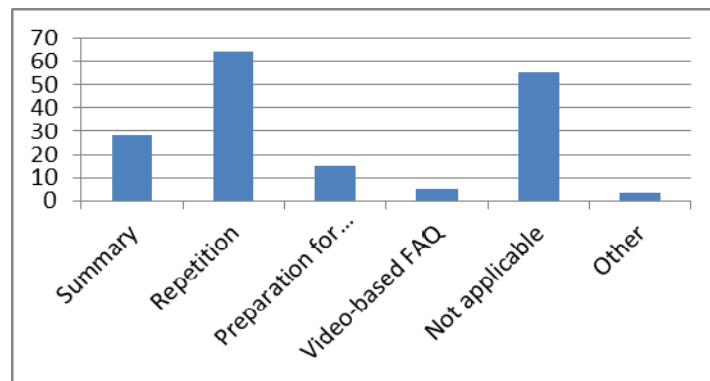
Figure 5. Application areas of EPE videos used for follow up work.

The evaluation framework allowed multiple values to be filled in when evaluating the intention of the EPE videos in follow up work. 29 out of 132 videos were described to fit more than one of the descriptions, which means that a video can be used for e.g. both repetition and preparation for exam.

4.1.4 Assessment Phase

The assessment phase was divided into two categories: formative and summative assessment. 23 of the videos were found applicable for formative assessment (figure 6). Some of the videos could be used as video blogs for reflection (6 videos), self-evaluation situations (6 videos) or self-testing purposes (5 videos). Three of the videos also were adequate for video-based feedback from the teacher. Just two videos were adequate as pre- and post-video to visualize and measure the learning progress, and one video was possible to use for peer assessment purpose. Four of the videos had multiple possibilities for formative assessment.
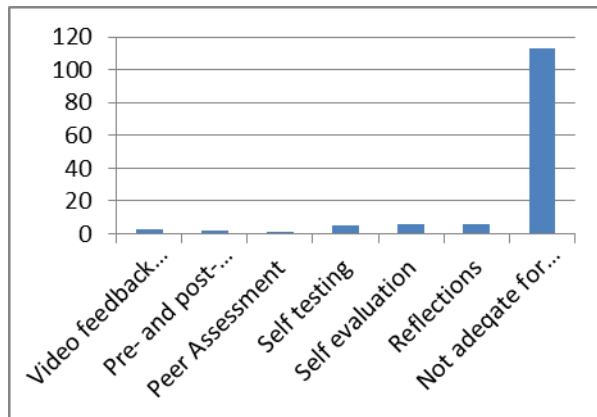

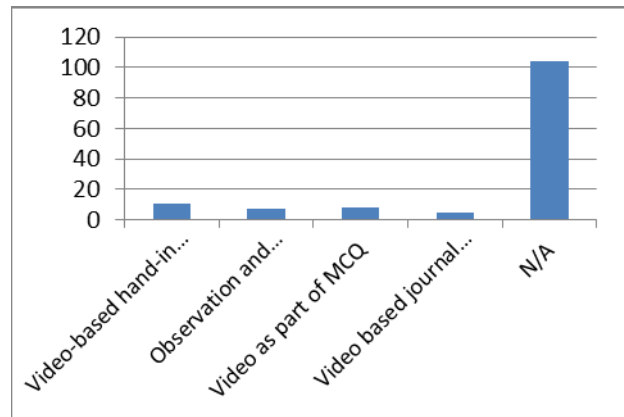Figure 6. Use of EPE videos for formative assessment

Figure 7. Use of EPE videos for summative assessment

The evaluation shows that 33 of the videos were applicable for summative assessment (figure 7). Most applicable was use of video-based hand-in (11 videos) and use of video as a part of multiple-choice questions (8 videos). Seven of the evaluated videos could be used as for teacher generated observation and analysis and five could be used as a video-based journal for documentation. Six of the videos had multiple possibilities for summative assessment.

5. DISCUSSION

The results presented in this paper are based on an evaluation framework for EPE videos, which is developed as a tool for researchers to be able to characterize EPE videos for learning situations and a tool for teachers/teacher students who want to learn about multiple ways of varying the use of EPE videos in their teaching practice. This evaluation focuses on video resources chosen by the teacher in a process of

planning/teaching. It does not include student-generated videos, which also can be valuable learning resources. The results are based on the evaluation of 132 EPE videos. The number should be increased if the goal is to specify exact use of the educational videos. Six of the chosen EPE videos were evaluated twice; these videos are included because different teachers have different perceptions on how to use the videos in a teaching and learning situation. The findings presented should be considered as an attempt to start the work of defining the variety of EPE video use. The evaluation indicates that EPE videos tend to be used more in the preparation phase and the learning activities, than as follow up work and assessment.

One of the reasons why many EPE videos are used for the preparation phase might be the influence of methodologies like the flipped classroom (Bennet et al, 2011) and video vitamins (Rismark et al, 2007) together with video web sites like Khan Academy and TED talks. Video is a well-known and useful tool for web-based tutorials, presentations and demonstrations. These are methods often used in a preparation phase. Another reason why many EPE videos are used for the preparation phase is that we want students to be prepared and to make the cognitive awareness start working on a certain topic.

Based on the evaluation and our findings we present an illustration (figure 8), which provide an overview of opportunities when and how to use EPE videos.
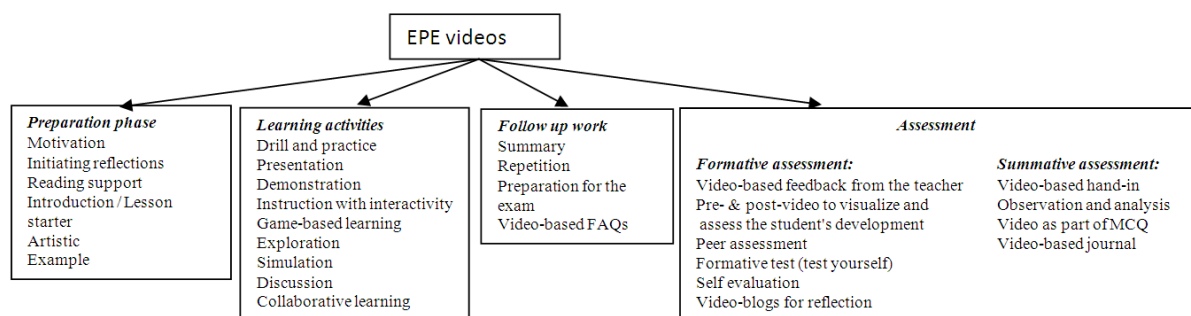

Figure 8. The variety of EPE video use in different phases of the teaching and learning process.

Flipped classroom methodology (Bennett et al, 2011) grows popular and represents the use of videos in the preparation phase. The flipped classroom methodology focuses mainly on the teacher's presentation/introduction of new learning material. There are other pedagogical methods than presentation, which should be considered when planning to use EPE videos. The flipped classroom methodology mainly focuses on video use in the preparation phase, but EPE videos should also be considered in other phases of a learning process, e.g. as follow up work or assessment.

Using EPE videos as part of the learning activities e.g. in the classroom, our findings indicates that EPE videos usually are based on presentation and demonstration as pedagogical methods. There are a number of other pedagogical methods that are not often used today. One may explain this by considering video as a useful tool when it comes to demonstration. When teaching e.g. a skill, the procedures can be described through text and still images in a book or through audio, as the teacher is explaining. Using a video one may include both a visual, oral and textual explanation of how to perform the skill. Motion pictures are usually more powerful than still images when the goal is to demonstrate a skill.

Hopefully, the use of a variety of pedagogical methods will increase in EPE videos in the phase of learning activities. Teachers should become aware of the possibilities in the use of EPE videos, e.g. within mathematics, the use of simulation as pedagogical method might work as a tool for improving the cognitive understanding of a certain topic. Using EPE videos in order to visualize mathematical simulations –will hopefully make students better prepared for their classes and give them a better foundation to understand mathematical topics. Research within the field of mathematics shows that it is more efficient to work with the subjects based on an inquiry-based approach, making the students ask questions and wonder about why different mathematical formulas are defined the way they are, giving them a greater chance to understand the issue rather than just making use of a mathematical formula about which they do not understand the logics (Fuglestad, Goodchild & Jaworski, 2007, Jaworski, 2006).

We also believe that EPE videos can be useful in follow up work. Examples of EPE videos as follow up work are to make EPE videos summarize students' assessments, give them an overview of rights and wrongs and show good examples. This will give students the opportunity to use videos in different phases of their learning process, and provide visually-oriented students the opportunity to use their advantages for learning.

One of the reasons why only a few EPE videos evaluated are used for assessment might be because these videos are not necessarily widely published, as they mainly are useful only for a few persons. Feedback on hand-ins in many cases would be considered personal feedback, which is not relevant to publish on the web. A video blog for formative assessment, however, would probably be published open for anyone.

6. CONCLUSIONS

The paper has based on the results of an evaluation of 132 educational videos, presented possible use of EPE videos in different phases of a learning and teaching process. Our findings show that all opportunities concerning EPE videos still are not extensively used. We believe that teachers who in the future want to use EPE videos in their classes, should be aware of the opportunities of video use in different phases of a student's learning process and the variety of different pedagogical methods an EPE video can be based upon. The paper presents an illustration, which describes an overview of pedagogical use of EPE videos.

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