

# TOGETHER WE CAN DO MORE



Executive Agency, Education, Audiovisual and Culture



Lifelong Learning Programme



## EUROPEAN THEMATIC NETWORK

### Future Education and Training in Computing: How to Support Learning at Anytime Anywhere



## REPORT

on

### WORK PACKAGE WP6

### Experimental results from testing Didactic models

### Deliverable(s) WP 6-4

**R E P O R T**  
on  
**WORK PACKAGE WP6**

**Experiment results from testing didactical models**

**Deliverable(s) WP 6-4**

Assembled and edited by:

Leon Rothkrantz

António José Mendes

Catholijn Jonker

15-09-2016

This deliverable has been produced with  
the contribution of all partners participating in WP6



This document has been produced with the support of the European Commission under the ERASMUS Programme, Project number: 539461-LLP-1-2013-1-BG-ERASMUS-ENW - ***Future Education and Training in Computing: How to support learning at anytime anywhere.*** It reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

No part of the report may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording; and may not be quoted or cited, without prior permission in writing from the Project Co-ordinator.

## TABLE OF CONTENTS

1	INTRODUCTION .....	5
2	Educational Background .....	7
2.1	Latest insights on educational aspects .....	7
2.2	Didactic models.....	7
3	Innovative Didactic models .....	12
4	DISCUSSION PAPERS E_LEARNING CONFERENCE.....	15
4.1	Abstracts papers special session e-learning conference at Berlin 2015.....	15
4.2	Abstracts papers special session e-learning conference at Bratislava 2016 .....	19
5	CONCLUSION .....	22

The goal of the WP6 project was to develop new didactic models using social media. Then the models have to be tested in some experiments. We were able to develop new didactic model, especially FETCH 2.0 as reported in section 3. In section 4 we report about the experiments. Researchers from the Universities of Ruse, Plovdiv, Rijeka and Delft did some pioneering work on the development of new didactic models. In the experiments it proves they were able to implement social media in their teaching-learning environment. It proves that students appreciated the use of social media and it proves that students were also involved in study activities outside the University and beyond the teaching hours. That supports one of the goals of the FETCH project “Learning anytime, anywhere”.....22

Preparing a new lecture a teacher has to define the teaching-learning goals, select the teaching topics order them to teaching learning material and design different ways of examination. But then a teacher has to make up his mind how to teach his students. Teachers are usually domain experts but not didactic experts. But to select the most appropriate didactic models has a great impact on the achievements of students. In the framework of WP6 some researchers developed innovative use of FETCH 2.0 and social media and made great contribution to the completion of the FETCH project.....22

Using social media and other tools from Web 2.0 has a great impact on the traditional way of teaching. We mention the following aspects:.....22

- Social media tools are not under control of the University and usually not integrated in common e-learning tools as used by the University.....22
- The role of the teacher changes dramatically from conductor of the teaching orchestration to facilitator of the learning process.....22
- Self-paced courses with a focus on individual working are replaced by courses with cooperation and networking.....22
- Peers have the role of fellow The affective role.....22
- The role of affections is of increasing importance in teaching learning. The use of FETCH 2.0 has a positive effect on the emotions of students. They have the feeling of presence in a community and not an anonymous role in the teaching-learning process. ....22

## ABSTRACT

In documents WP6.2,3 we described the developed didactic model FETCH 2.0 based on the use of social media. This document reports about the activities in the framework of WP6. FETCH partners were invited to report about didactic experiments. The focus will be on experiments using the developed FETCH 2.0 model based on social media, as presented on the e-learning conferences at Berlin and Bratislava. FETCH members presented about 80 papers on these conferences and about half of them were about didactic experiments using FETCH 2.0. Most of them tested parts of FETCH 2.0 in the regular classroom teaching. At special sessions of the e-learning Conferences there was a focus on the use of social media and FETCH 2.0.

In this report we present an overview of didactic models used by partners at their home Universities and our developed FETCH 2.0. Then we will discuss the didactic experiments of partners using FETCH 2.0 and social media. We will annotate the discussed papers and we summarize them in a concluding overview.

## 1 INTRODUCTION

In our first WP6-2,3 reports we introduced a new didactic model called FETCH 2.0 based on the use of social media. This model stressed the use of 21<sup>st</sup> century skills as cooperation, communication, networking, creativity and critical thinking. The innovative aspect of FETCH 2.0 was the replacement or extension of the classroom with learning networks of students and teachers supported and implemented by social media. In the second half of the FETCH projects, WP6 participants were invited to perform some didactic experiments using (parts) of the FETCH 2.0 didactic model. In this report we present some of the experiments as presented on the e-learning Conferences of Berlin and Bratislava. Some didactic papers were published at special session of CompSystech conference at Palermo. But these papers are not included in this report

About 80 papers were presented on the conferences and half of them had a didactic focus. Many participants developed their own didactic model and tested these models. The expectation was that most researchers presented some didactic experiments using the didactic model FETCH 2.0 based on the use of social media. But most researchers took an eclectic viewpoint. They mixed their own didactic model and classroom experiments with parts of FETCH 2.0. It proves that most researchers have limited freedom to do experiments. On the first place they have to teach regular topics in a didactic context and environment of the home University.

The use of social media in academic education is still under discussion. Many people involved in academic education believe it is an educational hype which will disappear after some years. But the use of social media is very popular among students. The challenge is to use the intrinsic motivation of students using social media also in academic context. But we observed the same attitude with respect to MOOCs. But now after 5 years the number of consortia and Universities involved in development of MOOCs is still growing and is now an established part of distant learning.

Changes in academic teaching are usually slow processes. Teachers having developed a successful teaching method like to keep it. But teaching is an always changing process. Successful teaching methods lose their attractiveness after some years and new teaching methods pop up and will be used. As expected young teachers are more open for the use of social media in education because they are more familiar with it and use it also outside the academic setting. Weeding and sowing are necessary processes and steps to have at the end a rich corn field. We believe that we are still in the preliminary steps of an established use of social media in academic settings.

In the FETCH 2.0 cooperation and networking has been stressed. But currently we observe also a trend to more self-paced individual courses. Special groups of students with limited time and opportunities for learning prefer self-paced courses and are not able to take part in time consuming network and social activities beyond the control of students. We advocate an eclectic approach. We believe that training 21<sup>st</sup> century skills should be part of an academic teaching. Students should also be familiar with social media. But there should also be time and space for individual reflective thinking in academic education.

In FETCH we modelled a network of cooperating teachers. We observe some upcoming initiatives of networks of teachers discussing new didactic approaches and problems and challenges in the daily life of teaching. The Adagio of the FETCH project is “together we can do more”. On all the conferences there were special discussion groups of teachers/researchers. At the last conference there was a special “round table session” organized around the future of distant learning.

Realizing the many pros and contras against the FETCH 2.0 didactic model we requested on our common progress meetings and Conferences members involved in the WP6 project to perform didactic experiments to test (parts) of the FETCH 2.0 model. We realize that most FETCH partners have a daily teaching job and little time and freedom to do experiments on new didactic concepts and settings. But like small pieces of a puzzle at the end we have a holistic view of all composed partial experiments. We consider our WP6 project as an expedition. The destination is globally defined but there is no clear and predefined way to realize the goals. The use of social media in education are mostly unexplored, so to research the use is a process of small steps in forward and backward direction. The main task of the project leaders was to place signs at the right time and place to guide members in the expected direction.

FETCH is a community of participants having a great impact on individual members. It offers a place to meet colleagues, to get new information and ideas and provides room for discussion about joint experiences and innovation. It can also provide stimuli to members to start their activations. In the next section we will describe first recent didactic developments. Then we will discuss the developed new didactic models. We will extract characteristic features. In the last section we discuss selected papers from the e-learning conferences. In our comment of each paper we discuss in how far the characteristic features of FETCH2.0 are used. We end this report with a final conclusion and future work.

## 2 EDUCATIONAL BACKGROUND

### 2.1 Latest insights on educational aspects

*Educational Adagio  
We teach today's students  
With yesterday's knowledge  
For a future we don't know (a well-known saying)*

In mathematics it is still common use to lecture with blackboard and chalk. The use of PowerPoint presentation is not common practice. In a course on calculus a lecturer shows how to solve mathematical problems by providing many examples. The idea is that students learn by imitation. Over the years it proves to be a successful method. In courses on psychology a lecturer reports about famous experiments. In this way he/she hopes to introduce students in experimental psychology. A good lecturer in philosophy or history is supposed to provide and deconstruct narratives. Lecturers in different disciplines have developed over the years their specific, but effective and efficient way of lecturing.

The educational process is very dynamic. Attractive and effective teaching methods and books lose their attraction after just a few years. This implies that the process of teaching-learning will never stabilize but is always changing. To teach CS to students, it is necessary to have a clear concept of the content, a list of topics at different levels, the time spent on a topic, and a frame of reference, showing how to fuse the different topics together. Next, a lecturer should have the abilities for and ideas on how to present the different topics to his/her students. An individual course should be part of a curriculum where different courses are organized and related to each other in such a way that they fulfil target goals and requirements. The outcome of the teaching-learning process should be assessed and the process should be evaluated continuously. In this section we discuss the different topics in more detail. The kernel of the teaching-learning process is the didactic model. Most universities use some form of 'blended learning' in their teaching-learning environment. The didactic concept of 'blended learning' is about the integration of classical classroom teaching and online learning. In this report we focus on online learning as source and facilitator of didactic innovation.

Recently a new phenomenon is emerging in academic education: learning communities, social learning, communication, collaboration, creativity and convergence. The rise of social media in daily life of students prepares the use of social media in academic education and upcoming networks of students. Communities exist already for many years in Computer Science. Students are familiar with the concept user-group. Computer science students experience problem with computers or developing software consult a user group. These groups offer the facility to post a message and peers send an answer in a short time. Many students take part in game playing including serious games. Most games started as an one-player game, but now many games have a multiplayer variant and players of a specific game are member of a game network and communicate about the challenges of the game and other game topics.

### 2.2 Didactic models

At this moment the different FETCH partner Universities each have their own characteristic didactic model. This model should be used by all lecturers in their teaching process. Most lecturers use models inspired by the models they experienced as students. Or they use didactic models in an intuitive, less explicit way. Most lecturers agree that students should be educated as scientists and for example as CS experts. For some of them it is questionable if they have an important role in the personal development of their students. Different teaching modes are used, but most lecturers focus on individual instruction in their lessons inspired by different didactic models, such as mastery learning, drill and practice models, or blended models, etc. The main goal is to educate students as individual researchers.

After graduation many students find a job in industry, government, commerce, teaching, etc. Education as an individual scientist may be the best education for such professions, but in addition to problem solving, critical thinking and other abilities are required, such as the abilities to cooperate in networks and projects, to communicate, and to negotiate. In many national or European research projects, the focus is on cooperative research. So pertinent questions are: do we still have to educate students as passive consumers of content or as active co-producers of knowledge? Do we have to

train students how to read scientific books and papers or how to use web technology to acquire knowledge? We observed many forms of blended teaching-learning models, but in the near future didactic models will be needed with a focus on student-centered learning and user-driven education. In Figure 3, we depicted how ideas from social networks, the central role of the lecturer as designer, coordinator, and manager of the learning-teaching process (interacting in a blended-learning process with a 'cloud' of students) will be replaced by an educational network of "study-friends" (a potentially much larger, world-wide 'cloud' of students who will primarily interact with each other and the online material, once provided by the teacher). Bottom-up learning processes will replace the top-down approach currently used by universities.

Looking beyond most of the FETCH partners, we observe an exponential growth of Massive Open Online Courses (MOOCs) in the academic world. Globally, many top universities are forming consortia to design MOOCs such as edX, MITx, Harvardx, Coursera and Udacity. In the Netherlands, Delft University of Technology already offers more than twenty MOOCs on different topics. In the framework of the FETCH projects some MOOCs have been developed (see chapter 4). The learning material is distributed via worldwide network of connecting students. In 2016 more than one million student took one or more courses. They have access to the material anytime, anywhere, with communication via social media playing an important role. For example, traditional e-learning platforms such as Blackboard now incorporate social media functionality, supporting instant messaging and the formation of interest groups.

### 2.3 Professionalization of lecturers

From a lecturer we may expect that he or she is an expert in his area of specialization. Because research and education are two sides of the same coin, it is necessary for a lecturer to be involved in research. In that case he/she is able to illustrate his/her lectures with findings from his/her own research. A lecturer should be a role model for his/her students. When the goal of academic education is to educate students as scientists, the lecturer should also be able to play the role of scientist.

Students have to find their passion, a study should inspire them, providing them creativity and motivating them. One of the main tasks of a lecturer is transmitting knowledge. But a lecturer is also a tutor for his/her students guiding them in their educational growth as human beings and as scientists. Peer students also play an important role in the learning process. In didactic models that are based on social learning, students learn from one another by cooperation and interaction, often using social media through Web 2.0 technology.

Most lecturers present their lectures in a content-centered approach and not in a student-centered learning approach. Because lecturers are CS experts, they have a global overview of the areas of CS and of the topic of their lectures in more detail. The different topics are presented in alignment with the written lecture material or according to CS theory. They present the learning material in the way an CS expert does or should do. But there is a difference in presenting an CS topic as a survey or as learning material to students. The lecturer should be aware of his/her didactic model but also of his/her teaching goals. In discussions with lecturers one of the most positive aspects of special training courses as professional lecturer was reflection on their learning goals. Even lecturers with many years of teaching experience had to admit that, thanks to these courses, their intuitive way of lecturing had been upgraded to a higher level. A more detailed outline of their lectures based on reflection and on critical analysis of their own teaching behavior is at the base of the teaching process. It is also necessary to write the goals down in an explicit and operational way, enabling them to be testable. Ill-defined goals result in vague evaluation.

In Section 3 we discussed a social learning network of students. There should also be a social teaching network of lecturers. Via such a network, lecturers can inform each other what is going on, exchanging information about courses, time schedules, activities, etc. Most importantly, lecturers should discuss a common didactic model and the synergy between different courses. Via such a network, lecturers are able to cooperate and to learn from each other, as assumed in social network learning. Most lecturers are not fully aware about the content of their colleagues' lectures, the different teaching styles they use, and any incidents or problems. It is not commonly done to visit each other's lectures. The network should not be restricted to one university, but should include all universities. A similar process has been started at secondary schools, initiated by two teachers (Kneyber & Evers, 2014).

## 2.4 New didactic models

In Figure 3 we display our didactic model based on the use of social media in open and online learning. The focus is on communication and cooperation of e-learners. So we assume that the different components are connected and integrated in an e-learning environment via a social media framework. In designing the learning modules, the lecturer can choose different didactic methods and models such as web lectures, autonomous learning, practical, case studies, simulations, reading scientific literature, posing scientific questions, defining problems, problem solving, cooperative learning to model the teaching learning process. All these methods are well known, used in many e-learning courses or classroom courses, and they facilitate a certain modality of learning. Innovative teaching technology has been described in the popular book “Teach like a champion” of Doug Lemov. In his book he reserves a central place for teachers. He stresses the bottom approach of teaching innovations instead of the top down approach by the Board of the school.

But as stated before, the innovative aspect of our perspective on didactics is a social network of cooperating “study-friends”. They communicate with each other by sending tweets, information on Facebook or WhatsApp. As shown in Figure 3, there is a cloud of connecting, interacting students distributed over a huge (worldwide) area. In principle every interested student can have access to the open network and no entrance exams are required. It is assumed that the network filters out students with the expected abilities, motivation and study involvement. Lecturers play a minor role in the learning networks. But they have a leading role at the startup of these new types of courses. An interesting aspect in Figure 3 is that there is also a cloud of connecting, interacting lecturers based on social media or classical emails. It can be expected that over the coming years there will be more cooperation between lecturers in the CS communities.

## 2.5 Similar trends in research and education

The last decennia we observed a revolution in the research community. For many years researchers were involved in individual research. Regularly at conferences and workshops they presented their recent scientific results and wrote papers in journals. There were famous examples of researchers working for years in splendid isolation. Nowadays networking is the buzzword. National or European research proposals are based on joint research activities. Proposals include planned research activities and to be expected deliverables, ordered in Work Packages.

Packages and time schedules are submitted by a group of researchers distributed over universities and countries. In parallel we observe a similar process in business communities. Local companies are fused to worldwide enterprises. From people involved in this business it is expected that they have excellent networking abilities. From universities as educational Institutes maybe expected that they take a leading role in this process. Opponents may argue that paradigm shifts in the process of teaching-learning take a long time. That is definitely true, but recent developments around MOOCs prove the opposite in this particular case. Maybe the reason is that excellent lecturers and excellent Institutes and universities take the lead.

Development of MOOCs is no longer business of some universities. On 17 November 2014 the Ministry of Education in the Netherlands started a call for project proposals for open and online learning. There is a yearly budget available for the period 2015-2018. There is also a call for project proposals for research in open and online education for cooperating educational institutes. These calls provide an opportunity for the AI community in the Netherlands to start common activities on MOOCs development. An interesting aspect of MOOCs is that part of the educational material can be used as modules in blended learning. We discussed already the option to develop a joint e-learning CS-curriculum in the framework of the FETCH project. All FETCH partners can offer the whole curriculum or part of it to their students. Developing educational material is a time consuming process which requires many man-hours and expertise. For that reason, we propose an educational network of AI involved lecturers. One of the CS partners should take the lead.

Coursera, edX and Udacity are consortia of international excellent universities focused on the development and distribution of MOOCs. They provide courses that may be of interest to students around the world. Sebastian Thrun developed an excellent AI course distributed via Coursera. Thousands of students followed this course. But it turns out that only a fraction of registered students finished the course. Now students have to pay for the course in advance. If they find a job after finishing the course the money will be returned. The amount of dropout students dramatically decreases. Blended courses including MOOCs show promising results. Students with an academic degree profit more from MOOCs. MOOCs offer great opportunities for “lifelong learning”. An interesting option is to develop a common MOOC (or set of MOOCs) for the CS community. We

challenged FETCH partners to focus on developing MOOCs of their own. Traditional courses can be transformed to MOOCs. But the development of corresponding didactic models is lagging behind.

Most CS lecturers are involved in CS research and less in didactic research. But all involved universities have a central service of educational experts. Developing appropriate didactic models underlying MOOCs is a matter of joint research of AI lecturers and educational experts. An academic study is supposed to provide a basis for lifelong learning. Training students as a scientist provides them the knowledge and abilities to increase/adapt/apply their knowledge. Additional research is needed to validate this hypothesis. Industry continuously complains that students are only educated as scientists. So universities have to show that students are also adequately prepared for occupations outside academia. It may be expected that universities put more effort in alumni networks.

Social media again provide a challenging opportunity. An interesting question is how to integrate mechanisms in the curricula such that that they optimally adapt to new developments. As mentioned before staff and curricula have to anticipate on continuous change. It is a long debate whether the task of universities is to transfer academic knowledge or also to contribute to students' personal development. AI topics as robotics, artificial life, intelligent agents are strongly linked with philosophical, psychological and ethical themes. CS provides the opportunity to educate students not only as scientist but also as human beings. The integration of topics from psychology and philosophy should be used in the education of students as human beings.

## 2.6 A Survey of Didactic Concepts

To get an idea which didactic models are currently used we surveyed the Webpages of some Universities in the Netherlands looking for didactical approaches of that University. We observed many didactic approaches. Most of them are fusions of well-known didactic concepts but adapted to local use. But in interviews with teachers of those Universities it proves that they have only a global awareness of globally stated educational approach. We realize that opinions about didactics on the central level can be quite different from the individual lecturer in the classroom. We found some reflections on didactic concepts and present an adaptation in this section. We were unable to do a similar survey under FETCH partners because many WEB pages are not in English or don't report about the used didactic model in details.

An interesting educational concept used by the University of Maastricht is problem-based education (PGO). This concept is by some Universities transformed to the PCL concept (Project-Centered Learning). Here the students learn to apply the knowledge they gained in the courses in realistic and challenging projects. In small groups students perform all aspects of medium to large scale projects. In Wikipedia is stated that Project-based learning (PBL) is a student-centered pedagogy that involves a dynamic classroom approach in which students acquire a deeper knowledge through active exploration of real-world challenges and problems. Students learn about a subject by working for an extended period of time to investigate and respond to a complex questions, challenges, or problems. It is a style of active learning and inquiry-based learning. PBL contrasts with paper-based, rote memorization, or teacher-led instruction that simply presents established facts or portrays a smooth path to knowledge by instead posing questions, problems or scenarios.

Most Universities structure the learning material from simple to complex in the curriculum. In the bachelor program students learn the basic abilities enabling them to progress in the master program. The basic abilities are design and performance of empirical research, programming, proving correctness and completion in formal languages. Such a program makes sense if students follow the whole program. But students switching from Universities or taking courses from different Universities may run into problems. The motivation of students is challenged. Only at the end of the study they understand why the basics in the first years were needed.

The goal of the University of Groningen is to teach in a manner that supports the development of each individual student to an independent, proactive adult who can function in a professional manner within fields related to Computer Science. In order to reach this goal the student development is supported on several levels. The first goal is to help students develop theoretical as well as practical proficiency at a superior level in the core fields of Computer Science. Students are also trained to be efficient communicators, both in text and speech. Equally important is the commitment of teachers in helping students to develop key professional competences, including effective project planning, time management tools, good work habits including punctuality and professional presentation, goal setting skills, teamwork experience and leadership abilities.

It is believed that these skills are best fostered by treating students as developing professionals from the beginning of their academic studies in the following approach:

- stimulating professional behavior rather than penalizing unprofessional acts
- level of skill and knowledge is not determined by unchanging cognitive abilities but that proficiency grows with time and effort invested in learning and practicing
- to be aware of the differences between students depending on their study experiences and taking this into account in course planning and execution
- students differ in their prior knowledge and ability on a specific field of study and lecturers take this into account in the way they teach their materials and organize their course
- evaluation of student's work must be done in an objective and transparent manner
- the main role of a lecturer is to guide students.

At the Vrije Universiteit of Amsterdam the curriculum is set up from a problem-oriented perspective. Different subjects from a number of disciplines are included. To build an effective curriculum, explicit attention has to be paid to integration, analysis and application of the chosen subjects. The teaching concept of the Department corresponds with the general teaching concept of the university. There is no central pedagogical didactic concept for all Faculties such as PGO (Problem Guided Education) or SGO (Student Centred Education) only guidelines. VU University sees education as a "community of learners". We observe that this is in line with our FETCH 2.0 model. One of the five characteristic features is that students will become familiar with the culture of research and the practice as academic professionals.

The underlying didactic concept at the University of Nijmegen of the bachelor program is SAE (Student Activating Education). The three guiding principles of SAE are:

- Self-responsibility/increasing self-management and goal directed education
- Cooperative learning including the pre-organized and self-organized form
- Conceptual learning in a challenging learning environment.

Again we observe elements from our developed FETCH 2.0 model.

At the University of Amsterdam "Learning by doing" and "active learning" are the relevant principles underpinning the teaching and learning in the bachelor program. The program provides a well-balanced mixed of knowledge acquisition and knowledge application. The educational design is also inspired by Bloom's taxonomy. Within the cognitive domain, courses and projects in the program cover at least knowledge, comprehension, application and analysis. The bachelor program provides students the opportunity to tailor their learning experiences to their own interest, by choosing self-proposed projects, and can use elective courses to further develop their interest.

### 3 INNOVATIVE DIDACTIC MODELS

In the past many didactic models have been developed. Such a model should describe the teaching learning process and the conditions for optimal performance. A didactic model should provide insight in the phenomena of delaying students and dropouts. A diagnostic instrument is needed to detect delaying students as soon as possible and to provide assistance by student-counselling. In many models characteristics of students and Universities have been developed to predict the course of the interaction process of teaching learning of individual students in the future.

Describing students as open systems implies an ecological attitude with respect to causality. Context and evolution have to be considered. Success of study is not only dependent of student's characteristics as capabilities, knowledge, used study methods, but is the result of a complex interaction process. This will be the basic idea underlying our didactic model presented in this section.

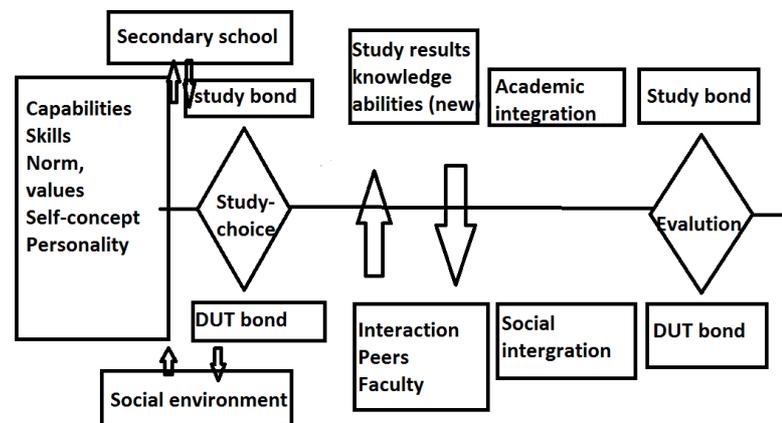


Figure 1: Didactic model based on the interaction student with teaching learning environment

We discussed a didactic model for regular courses and validated this model by survey research. In case of distance learning including MOOCs there is a focus on direct interaction student-learning material within a short time window of interaction. We stress the fact that the interaction is a dynamic process which can increase or decrease in intensity. In the next Figure 3 we display our didactic model on micro-level.

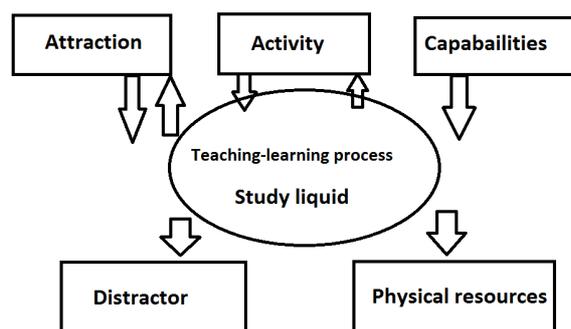


Figure 2: Didactic model describing the momentary interaction student learning material.

We discuss the components of our interaction model in more detail:

**Attraction:** An important component in the interaction student learning material is interest of students. As long as the learning material is interesting a student keeps on board. But as soon the learning material gets boring, student lose their interest and the dropout process has been started. In case of regular courses there is a lot of pressure of peers, Institute, teaching schemas to follow lectures the other day. New topics provide opportunities for a new start. Usually this is missing in case of MOOCs. By the huge amount of students individual tutoring is difficult to realize. A special didactic approach is needed. The span of attention or control is very short, only some minutes. A varied way of presentation of learning material is needed by showing movies, video lectures, simulations and

interesting applied assignments for students. After positive experiences of the students with the learning material the attraction will be increased. For example after solving assignments, understanding the learning material, or after positive feedback of peers or tutor.

*Capabilities:* A student assumes at start he has sufficient capabilities to complete the course successfully. But when he interacts with the learning material and it proves that it is far beyond his capabilities, the dropout process has been started. In regular face to face courses a student is not allowed to leave the teaching hall. In case many students lose their interest an experienced teacher starts a summary, a clarifying example to get students back in the teaching-learning process. In regular courses there is support of peers during the breaks or after the lectures. In MOOCs social support of peers is wanted but usual less developed. There is a trend to develop MOOCs as self-paced courses for individual students. That makes these students vulnerable for negative interactions.

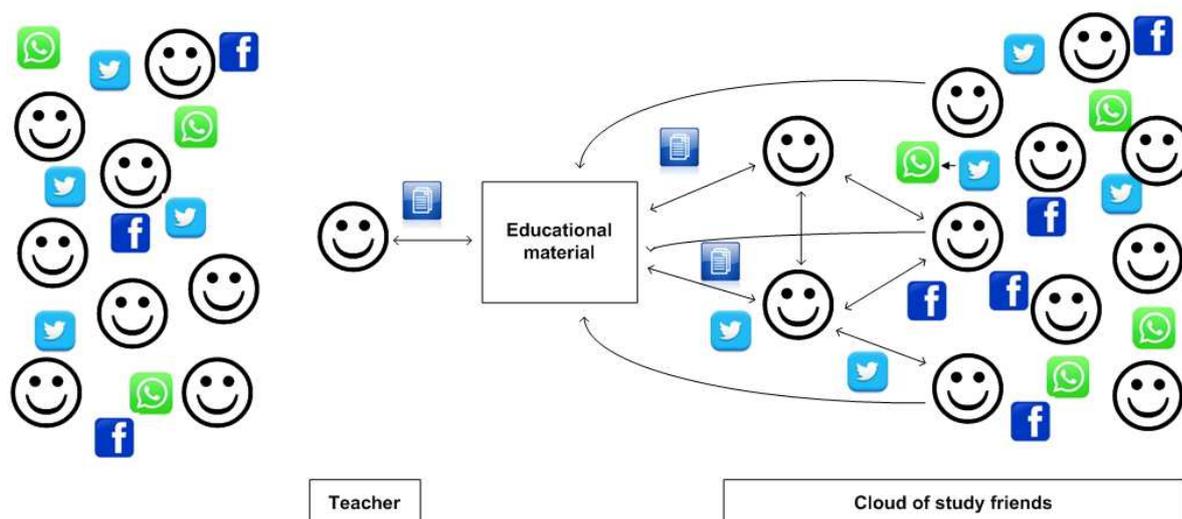
*Activity:* Attractive learning material and required capabilities are prerequisite of a positive interaction process of a student with his learning material. Next a student is assumed to play an active role in this process. Many students read the description of the offered courses, they even enrol in the courses but the next step is to start the study activity. Most MOOCs are not designed for passive students, a lot of activity is required—varying from posing and answering questions, making assignments and involvement in project activities. After positive feedback from the interaction process of students with the learning material the activity can be increased

*Distraction:* Interest and sufficient capabilities are the positive drives of the interaction students with the learning material. But there are also two negative drives. Distraction is the first negative drive. In case of MOOCs students usually study in a stimulus rich environment. The computer used for taking the course offers a lot of alternatives for distraction especially in case the MOOC material gets boring or is beyond the capabilities of students.

*Physiology:* A second negative drive is the physiological state of the students. If a student gets hungry, sleepy he can start a break. A lot of discipline is needed for a restart and to keep the length of the break under control. In case of regular courses there are social rules, institutional rules regulating breaks.

In the Figure 2 we displayed the teaching-learning process of MOOCs on a micro-level. The model has been validated by some exit interviews of students. Drop-off students usually receive a questionnaire to research the causality of a drop-off. But the response of such questionnaire is usually very low. So additional research is needed.

In the first two years of the FETCH project (reported in WP6.2) we developed new didactic models for open, online learning. We first give a description of the models and summarize the main characteristics in Table 1.



**Figure 3: Display of didactical model FETCH 2.0 for open and online learning using social media.**

In Figure 3 we display a model for open online learning. Students are grouped in a network of study friends and cooperate via social media. Every student has a role in the community and gives them a high feeling of presence and boost their motivation. Also teachers are connected in a network

and communicate about teaching and learning. The role of the teacher in the learning process is minimised. Peers take the role of tutor and supervisor. Students have free access to the learning material anytime anywhere. A great part of the study-material is free available on Internet. The learning material allows student to control their own study (self-paced) but in many assignments students have to cooperate and communicate. The learning material triggers students to study activities and increases their motivation.

**Table 1: Characteristics developed didactic FETCH models.**

Open, online learning	Students have access without entrance exam
Social media	Social media play an important role in the communication students and teachers
Emotions	Study, cooperation, study material and being a member of a community provide a lot of positive energy
Teacher	Role of teacher is minimised, taken over by peers
Community	Individual learning and group cased learning
21 <sup>st</sup> century skills	Cooperation, networking, creativity, problem solving

## 4 DISCUSSION PAPERS E\_LEARNING CONFERENCES

### 4.1 Abstracts papers special session e-learning conference at Berlin 2015

**Partner:** Hasso-Plattner-Institut for IT-Systems Engineering, University of Potsdam

**Title:** Massive Open Online Courses New Ways of Tele-Teaching/E-Learning

**Author:** Christoph Meinel

**Abstract:** *OpenHPI, the interactive online education platform at Hasso Plattner Institute (HPI), is one of the first platforms in Europe to offer freely accessible, massive open online courses. In a manner similar to the massive open online courses (MOOCs) first offered in 2011 by Stanford University, and later by other elite American universities, openHPI provides learning videos on the Internet as well as extensive reading material.*

*These offers are combined with learning-supportive interactive self-tests, homework and exams. The secret of this innovative form of tele-teaching/e-learning is the coupling of multimedia learning possibilities with social media interaction forums. This combination manifests itself in learning-supportive, virtual social learning communities. OpenHPI and MOOCs stand in contrast to “traditional” lecture portals, for example the HPI tele-TASK portal <http://www.tele-task.de>. Such portals “only” provide multimedia lectures and presentations that are primarily of benefit to autodidactic learners. On the other hand, MOOCs and openHPI offer didactically designed online courses in which learners and the teachers are connected in a virtual community. In this environment, processes of group dynamics support learning success to a great degree. This is a fact reflected in attendance numbers that exceed 200,000 participants - who are by no means exclusively college students. Already 20,000 attendees have successfully completed a course and earned a certificate.*

**Keywords:**

**Comments:**

This paper presents a learning platform which has all the characteristics of FETCH 2.0: networking, cooperation, social media. Teachers and students are connected in a virtual community and also students communicate via platforms using social media. Unfortunately, the paper is an extended abstract and has no details about the used didactic model in details. The authors report that last year there were 200.000 students and 10% of them finished the chosen course successfully. The authors state that the courses are not only for auto-didactic learners as in traditional e-learning. The group dynamics support and stimulate students in their learning. Unfortunately, no details are provided. But the presented project is a challenging alternative for the well-known MOOCs consortia in the United States.

**Partner** University of Plovdiv

**Title:** Social Networking in the Information Technology Training

**Authors:** Rositsa Doneva, Sivia Gaftandzhieva

**Abstract:** *The paper is related to exploration of a didactical model that relies on the new Web technologies to realise the idea of e-learning 2.0 for training in the field of Information Technology. For exploration of the didactical model a specially designed e-learning course in Spreadsheets is developed and Web technology tools are integrated to support increasing the learning effects of different learning activities. The paper presents a part of the study that shows how social networking sites can be used to improve different learning effects of different training activities (knowledge assessment, individual work, presentation of primary and supplementary learning resources etc.) in the Spreadsheet e-learning course.*

**Keywords:** Social Networking sites, e-learning Spreadsheets, Web 2.0, Web 3.0, Facebook, Twitter, Moodle, Information Technology.

**Comment**

This a very interesting paper. Not only because the FETCH 2.0 didactic model has been implemented but also because the authors tested the model in a specific e-learning course. Students have to take video lectures, have to do assignments, but students discuss about the learning material via social media tools. The course has been implemented using Moodle. In the paper different kind of learning activities are presented. Unfortunately no statistics are presented about the learning activities, the outcome of these activities and the role of the teacher.

**Partner** Delft University of Technology

**Title:** Pre-University Calculus MOOC with inquiry based learning as didactic model

**Authors:** Leon Rothkrantz

**Abstract:** *It proves that many starting students at Technical Universities don't have the required mathematical knowledge and abilities. This is caused by educational gaps at secondary schools, disinterest of students and a process of forgetting over time. At TUDelft a MOOC has been developed to train new students in mathematical calculus during the summer holidays before start of the academic year. The underlying didactic model is based on inquiry learning. The MOOCs can be downloaded on mobile devices and the used didactic model can be combined with cooperation and network learning*

**Keywords:** *MOOCs, mathematics, pre-university courses, inquiry-based learning, network learning, FETCH 2.0.*

**Comment:**

This paper reports about a MOOC developed at Delft University of Technology. MOOCs are one of the latest developments in open online learning. Via edX consortium students have access to the learning material including video lectures, simulations and assignments. Students are stimulated to communicate via social media. But it proves that many students like to work individually. Many students don't see the use of cooperating and networking. Most of the assignments are individually assignments and not group assignments. The challenge for the future is to integrate social media in the learning material in such a way that students have to use social media and students experience the advantage of cooperating and networking in processing the learning material. An interesting aspect is that students are not only requested to answers question but also to ask questions. It proves that in such a way students are more active involved in the learning process.

**Partner:** Vilnius University , Kaunas University

**Title:** A Research on Massive Open Online Course Design and Delivery

**Authors:** Valentina Dagiene, Danguole Rutkauskiene, Daina Gudoniene

**Abstract:** *The paper justifies the necessity to introduce to the society the Lithuanian case on massive open online course (MOOC) design and delivery. The problem is still available that academic society in Lithuania have no experience on the case and the research will help to plan, to design, to delivery and to provide MOOCs for wider society. The paper presents a research on the respondent's answers according to the questionnaire designed.*

**Keywords:** *MOOC, research, education.*

**Comment:**

This paper is about the experiences of the first MOOC developed at Kaunas University on information technology. Interesting was the investment of the motivation of participants to take part in such a course. The possibility to learn, discuss and share experience in e-environment was not appreciated by everybody. The main reason of participants to take part in the course that the learning material can be assessed anytime, anywhere and the possibility to harmonize learning and daily life. Participants also reported disadvantages of MOOCs such as self-discipline is required, no contact with teacher. Again we observe a friction between cooperation, networking and individually designed, self-paced courses.

**Partner:** University of Zaragoza

**Title:** Virtual USATIC: Collaborating and Sharing Experiences on Ubiquitous and Social Learning Training

**Authors:** José Luis Alexandre Marco, Ana Isabel Allueva Pinilla, María Teresa Lozano Albalate, Raquel Trillo-Lado

**Abstract:** *This paper presents Virtual USATIC (Ubicuo y Social: Aprendizaje con TIC), an initiative with totally virtual conference format, whose main goal is to provide a virtual environment where people involved in high education (students, professors, etc.) can share their experiences about the use of ICT in learning processes. At the same time, all participants can learn on the issues related with the virtual conference through virtual training workshops learning processes.*

**Keywords:** *Virtual Conferences, ICT, Virtual Learning Environments, Sharing Experiences, Social Media ELearning, New Didactical Models.*

**Comment:**

The paper reports about the design of a virtual community of teachers to share their experiences and also to set up training courses for participants, A 4-days conference was organised on ubiquitous and social learning. On the conference workshop ere organised and discussion groups to process the

presented information and to share common experiences with experiments. We can conclude that there are many initiatives around open and online learning and the numbers of interested people is growing.

**Partner:** University of Milan, University of Naples

**Title:** An Architecture for Sentiment Analysis in Twitter

**Authors:** Michele Di Capua, Emanuel Di Nardo, Alfredo Petrosino

**Abstract:** *Social network has gained great attention in the last decade. Using social network sites such as Twitter through the internet and the web 2.0 technologies has become more affordable. The heavy reliance on social networks causes them to generate massive data characterised by some computational issues as: size, noise and reliability. These issues make social network data complex to analyse manually, resulting in the adoption of computational tools. In this paper we discuss a recent software architecture, named lambda-architecture, modified with the introduction of machine learning components, in order to perform sentiment analysis on big data streams, as the one provided by the Twitter social network.*

**Keywords:** *E-learning, Sentiment analysis, Opinion mining, Big data, Social network, Lambda architecture.*

**Comment:**

The paper is about an interesting experiments using social media namely Twitter. The authors were interested in the emotions in the communications of partners. Emotions play an important role in e-learning especially in the motivation of participating students. But to analyse big data streams generated by social media is complex. The authors present a special tool to perform learning analytics on data generated in cooperative, network learning.

**Partner:** University of Novi Sad, Humboldt University

**Title:** : Us and Them –The Story of Joint Venture in eLearning of Teachers and Students

**Authors:** Zoran Putnik, Mirjana Ivanović, Zoran Budimac, Klaus Bothe

**Abstract:** *Over the years, we collected some excellent experiences considering the collaboration with students, in the field of creation of digital resources for use in eLearning. An important number of valuable electronic materials were created with the engagement of students of the computer science study program at our Department. After receiving initial created resources, lecturers had to work additionally to prepare them for use as a part of university courses, sometimes having to make significant and large scale changes. Still, work created by students was of a great value, for several reasons. First of all, students were introduced to principles and methodology of eLearning on some real life, practically usable material, thus being able to see all of the problems they might encounter in the future. Secondary, it gave us a lot of raw material to work on more, thus relaxing efforts for eLearning material creation. Finally, these resources introduced us to different, sometimes rather interesting views on problems and resources in question, or on teaching methodology, giving us new ideas, notions, and concepts to work with.*

**Keywords:** *eLearning resources, eCourse development, teaching resources creation*

**Comment:**

The paper is about an interesting experiment: giving students the role of a teacher in designing learning material. In our FETCH 2.0 model we consider communities of teachers and students. In this paper there is introduced a new community of teachers and learners

**Partner:** University of Ruse, University of Zagora

**Title:** Social Networking in Higher Education – Good Practices and a Case Study from Bulgarian Universities

**Authors:** Aneliya Ivanova, Vanya Stoykova, Galina Ivanova

**Abstract:** *One of the challenges to higher education nowadays is to adapt to the learning style, preferences and demands of the Digital generation. To achieve this goal, the educational process should extend beyond the university auditorium and to find a place in the social network where the digital students are most active. The modern ICT should also become an integral part of the administrative and educational activities at the University. In this paper is discussed the role of social networking in higher education, as well as the possibilities for teaching and learning in social WEB. A survey about students' attitudes to the use of social networks and cloud computing in higher education is conducted and an analysis of the survey results is also provided.*

**Keywords:** *generation F, higher education, social network, social network group, teaching strategy, cloud computing.*

**Comment:** In this paper the authors claims that social media have to be used in academic education, because students are familiar with social media and use it all the time. In the paper the authors discuss good practises of social networking in academic education. Next the authors also studied the willingness of students to use cloud computing and social networks. The authors report interesting results especially also about the interaction of cloud computing and social media. This paper is a strong support of the use of social media.

**Partner:** University of Ruse

**Title:** Facebook or Learning Management System

**Authors:** Irena Valova

**Abstract:** *This paper reviews the current research on the use of Facebook in e-learning and analyzes the differences between a Facebook group and a regular learning management systems. The main properties of both platforms are described and discussed.*

**Keywords:** *Facebook Group, Learning Management System, e-learning, social networking site.*

**Comment:** The paper is about an interesting experiment. Some students were using Facebook and the other students using a conventional LMS. The paper reports the experience. The use of Facebook shows promising results over the use of more traditional LMS.

**Partner:** Aalborg University

**Title:** The use of Video in a Mixed Classroom Approach

**Author:** Kurt Nørmark

**Abstract:** *This paper reports about an introductory programming course in which we have introduced 67 small videos. With use of the videos we have transformed the course from a traditional classroom approach to a mixed classroom approach. These terms are used as a contrast to “flipped classroom” which has become popular during the last few years. The results brought forward in the paper are, to a large degree, based on the student’s answers to a questionnaire about the use of videos during the course. It is concluded that most students evaluate the use of videos in a positive way, but that quite a few students do not watch all the available video material. In addition, it is concluded that the conditions for creating video lectures on a larger scale must be carefully analyzed, in order to find sustainable models that also fits the working conditions of the teachers.*

**Keywords:** *Traditional, mixed and flipped classroom; Short video lectures; Imperative programming course; Student opinions.*

**Comment:**

One of the challenges in Flip the classroom experiments is to design video lectures and simulations which should be studied by students before entering the classroom to discuss problems. The author used short video to introduce the concepts of programming and tested this approach in some experiments. The use of video lectures in difficult to visualise topic as programming was appreciated by the students. The cooperation and networking between students is not discussed in the paper.

**Partner:** University of Rijeka, Croatia

**Title:** : Improving a Blended Learning Model for the “Multimedia Systems” e-course

**Authors:** *Natasa Hoic-Bozic, Martina Holenko Dlab, Jasminka Mezak*

**Abstract:** *Existing blended learning models for e-courses should be improved in line with changes in the technology development, new pedagogical approaches, and feedback received from its participants. This paper presents improved model of the blended learning course “Multimedia Systems” designed for students of the undergraduate program in Computer Science at the Department of Informatics of the University of Rijeka, Croatia. In order to ensure usage of modern technologies and enable collaborative learning, new version of didactical model was designed. Individual learning activities were replaced with collaborative ones, performed using Web 2.0 tools and supported with educational recommender system. Analysis of students’ and survey results showed that introduced activities fulfilled their objective, but also that there is a need for emphasizing the advantages of collaborative learning and chosen learning environment in the process of further application of the model.*

**Keywords:** *E-learning, collaborative learning, e-tivities, Web 2.0 tools, recommender system, ELARS.*

**Comment:** The paper presents a new didactic model tested on a course on “Multimedia Systems”. Individual learning is replaced by collaborative learning one of the characteristics of FETCH 2.0. The forum discussion was replaced by using WEB technologies, including social media. To conclude in this experiment, the possibilities of FETCH 2.0 are fully explored and the evaluation shows a great satisfaction of students.

## 4.2 Abstracts papers special session e-learning conference at Bratislava 2016

**Partner:** Delft University of Technology

**Title:** : The didactic impact of the ETN FETCH project

**Authors:** Leon Rothkrantz

**Abstract:** *The ETN FETCH project is about Future Education and Training. One of the goals was to develop new didactic models and to include social media in the process of teaching and learning. Some new didactic models have been developed. We will report about them in this paper. FETCH partners also performed some experiments using innovative teaching models as Flip the classroom and MOOCs. The results are reported at e-Learning conferences. In this paper we will discuss the to be expected impact of the innovative didactic research of the FETCH project in future Lifelong Learning. We describe some real life events underlying the same didactical principles, showing the societal relevance and impact of our developed models*

**Keywords:** *Didactic Models, Social media, serious games, 21st, century skills.*

**Comment:** The author show that the underlying principles of the developed didactic model are visible in many trends in society. Teaching 21<sup>st</sup> century skills requires FETCH 2.0 or similar models. The author predict that FETCH 2.0 will be accepted as one of the didactic approaches in academic education the coming years. A special focus was on the role of serious games in academic teaching. The affective aspects of teaching and learning was stressed. To keep students on-board they have to be challenged, passionate and enjoy learning and teaching supported by a network of peers.

**Partner:** University of Seattle

**Title:** E-pedagogy as a basis for e-Learning

**Authors:** Josef Šimuth

**Abstract:** *This paper explains the principles of e-pedagogy which are necessary for any effective e-learning. The principles are based on our research studies as well s on our extensive empirical experience from creating and teaching e-learning courses at universities as within a corporate context. Our involvement has convinced us that the main obstacles in e-learning relate to the psych-social aspect of learning experience. Our research indicates that ICT is not the key aspect influencing effectiveness of e-learning. The relation between educators and learners is the one. Therefor there is need for creating a set of pedagogical principles applicable for e-learning. Our approach is based on the premise that good teaching methodologies must develop and expand both forms of learner's knowledge-tacit and explicit. In our contribution we formulate seven core principles for e-pedagogy taking into account communication. Students' characteristics and students' centeredness.*

**Keywords:** eLearning, explicit knowledge, tacit knowledge. e-pedagogy

**Comment:** In his paper the author presents pedagogic concepts and principles underlying e-learning. The authors claims that cooperation between learners provide the basis for effective e-learning. He also points to the affective aspects of e-learning. They also are basic characteristics of our developed FETCH 2.0 didactic model. The authors present 7 guidelines for effective e-learning.

**Partner:** Delft University of Technology

**Title:** A MOOC On Control of Flooding in Prague

**Authors:** Leon Rothkrantz

**Abstract:** : *The paper is about the development of a MOOC on the flooding of the river Vltava in the Czech country. The MOOC has been designed as a serious game. Students from all over the world are invited to take part in the management team to reduce the negative impact of the flooding. The MT has to take decisions about evacuation, building barriers and opening of dams upwards the river. Members of the MT negotiate via social media. The design and the implementation of the MOOC will be presented in the paper and the first results of experiments.*

**Keywords:** *Massive Open Online Courses, Social Media, Serious Games, Distant Learning.*

**Comment:** This is the first MOOC developed for Czech Technical University in Prague. The MOOC is developed on the basis of the FETCH 2.0 model. First the students have to watch individually video lectures about necessary background knowledge. Next students have to perform a group assignment. Participating students remote in place and time cooperate in small groups. They have to cooperate on common decisions via social media. This provides a natural but compulsory use of social media in distant learning. The tool has been developed using public domain tools. This opens opportunities for teachers to develop their own MOOC.

**Partner:** South East European University

**Title:** Practical Experience of Applying the Flipping Learning Model in a Master Course at SEEU

**Authors:** Marika Apostolova Trpkovska, Lejla Abazi Bexheti, Betim Cico

**Abstract:** *flipped Learning Model (FLM) is a relatively new model of instruction and educators understandably desire evidence that it has a positive impact on students outcomes, including achievement and engagement. Looking for learning methodologies that enhance student activity in the class, FLM was applied in the master course Information Technology Project management (ITPM) offered in the second cycle of studies, in the master Business Informatics program under Contemporary Sciences and Technologies faculty at South East European University in Tetovo. In this paper is presented a literature review and a case study relevant to the research and related to effectiveness of the Flipped Model in the classroom management for ITPM master course. It was found that student engagement and course results/grades increased, exceeding the actual professor expectations.*

**Keywords:** *Flipped Learning Model, Classroom Management, HE, New Teaching methods*

**Comment:** The paper is about an experiment with one of the most used didactic concepts nowadays: The Flipped Learning Model. The lectures of the professor including videos and quizzes were recorded and students have to study them in advance before going to the classroom meetings. In the classroom meetings there was a central role of the teacher. Communication and network aspects are not discussed in the paper. The authors are enthusiast about FLM and consider it as a great innovation in e-learning.

**Partner:** University of Ruse

**Title:** : An Approach of Using Social Media for Educational Purposes in University of Ruse

**Authors:** Galina Ivanova

**Abstract:** *The paper reports on a research that examines how University of Ruse students use social media as part of the educational process. Students' skills that can be achieved through the use of social media are discussed. Learning and teaching practices in six social media groups with regular and part-time students are summarized.*

**Keywords:** *social media, personal learning environment (PLE), virtual learning*

**Comment:** The author is one of the driving forces on the use of social media at the University of Ruse. In the paper she describes experiments where students were invited to use social media. They enjoyed it and it improved their results. One of the results of a survey under student revealed that students were also involved in study activities outside the University by communicating via the network of peers.

**Partner:** University of Plovdiv

**Title:** Towards Formal Acceptance of Using Social Networking in Higher Education

**Authors:** *Rositsa Doneva, Silvia Gaftandzhieva*

**Abstract:** *In recent years there has been extensive academic and research interest in the use of social networking for educational purposes. There is also a trend towards more formal acceptance of their role in higher education by participants in the educational process. The article presents the results of a survey on attitudes towards (in the direction from informal to formal use) the extent and scope of application of social networking in teaching and learning by teachers and students.*

**Keywords:** *Social Networking, Higher Education, Survey*

**Comment:** The authors discuss in their paper the results of a survey under teachers and students on the use of social media in academic education. In general teachers have a positive attitude on the use of social media. Students were enthusiast on the use of social networks. The results are promising for the use of social media in academic education in Bulgaria.

**Partner:** University of Coimbra

**Title:** Collaborative teaching & learning strategies: Developing, implementing and analyzing wikis and forums in e-learning environments

**Authors:** Celeste Vieira; Inês Messias; Cristina Martins; Carla Ferreira; Teresa Pessoa; António Mendes

**Abstract:** *This study looks into the collaborative pedagogical strategies employed in an e-learning course., “Learning and teaching Portuguese as a Non Native language”, promoted by a partnership between the Coimbra University Distant Learning Project and the Camoes Institute. Data analysis focuses on the student’s interactions during the group activity, while using wiki and forum tools. Since we aim to understand how to design and stimulate discussions and collaborative work in order to induce engagement and knowledge creation, a qualitative methodological approach was chosen for data analysis*

**Keywords:** *Collaborative strategies, wikis, forums, e-learning*

**Comment:** The paper reports about an interesting experiment on the use wikis and forums. One of the outcomes of the experiments was a positive correlation between the amount of interaction and positive learning outcomes. They also find that small online graduate groups prefer cooperation above collaboration.

## 5 CONCLUSION

The goal of the WP6 project was to develop new didactic models using social media. Then the models have to be tested in some experiments. We were able to develop new didactic model, especially FETCH 2.0 as reported in section 3. In section 4 we report about the experiments. Researchers from the Universities of Ruse, Plovdiv, Rijeka and Delft did some pioneering work on the development of new didactic models. In the experiments it proves they were able to implement social media in their teaching-learning environment. It proves that students appreciated the use of social media and it proves that students were also involved in study activities outside the University and beyond the teaching hours. That supports one of the goals of the FETCH project “Learning anytime, anywhere”.

Preparing a new lecture a teacher has to define the teaching-learning goals, select the teaching topics order them to teaching learning material and design different ways of examination. But then a teacher has to make up his mind how to teach his students. Teachers are usually domain experts but not didactic experts. But to select the most appropriate didactic models has a great impact on the achievements of students. In the framework of WP6 some researchers developed innovative use of FETCH 2.0 and social media and made great contribution to the completion of the FETCH project.

Using social media and other tools from Web 2.0 has a great impact on the traditional way of teaching. We mention the following aspects:

- Social media tools are not under control of the University and usually not integrated in common e-learning tools as used by the University.
- The role of the teacher changes dramatically from conductor of the teaching orchestration to facilitator of the learning process.
- Self-paced courses with a focus on individual working are replaced by courses with cooperation and networking.
- Peers have the role of fellow The affective role
- The role of affections is of increasing importance in teaching learning. The use of FETCH 2.0 has a positive effect on the emotions of students. They have the feeling of presence in a community and not an anonymous role in the teaching-learning process.

We stated already that the teaching-learning is an endless moving process. New concepts and methodologies appear and replace older ones. The use of social media is a new promising leaf attached to the tree of teaching-learning. The FETCH project has shown that the FETCH 2.0 model including social media is an innovative feasible new way of open online learning. Our expectation is that the model will expand in the next future to an established teaching methods in distant learning. We thank all the members of WP6 for their valuable contribution to this new way of teaching.

Workpackage leaders of WP6  
Leon Rothkrantz, António José Mendes, Catholijn Jonker  
Delft, September 2016