International Valorisation Conference

Key Methodology to Successful Competence Based Learning

Conference proceedings

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Self-assessment skills in school practice: approaches, tools, implementation in science education

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Self-assessment is a key personal characteristic. It is an expression of a person’s maturity and self-awareness. The formation of self-assessment skills in students is a key point in the educational process. The clear, correct and sustainable self-assessment requires the creation of a school environment that encourages self-criticism and reflection. This determines the need of teachers to focus on this problem in the early school years and requires a new view towards the strategies and tools of education used in the school practice. The report suggests a strategy for forming self-assessment skills in students of 5th and 6th grade in the Bulgarian schools. Instruments for student self-assessment have been developed and applied – rubric, tracker and exit slip, based on constructivist methods used in education – learning through experiments, problem-based learning and projects. The research was conducted during one school year and 30 students took part in it. The results show increased activity and learning motivation in the process of education. A permanent and deep adoption of knowledge and formation of positive attitude towards learning were observed.

1. Introduction

Self-assessment is a key personal characteristic. It is an expression of a person’s maturity and self-awareness. Formation of self-assessment skills in students is a continuous process in the school environment. This process creates the need for teachers to focus their attention on self-assessment skills from early school age. This requires a new perspective towards the strategies, methods and approaches used in the school practice. The objective of this research is: to develop and test a strategy for formation of self-assessment skills in students of 5th and 6th grade during the course of natural sciences study in the Bulgarian school.

2. Theoretical basis of the research

Natural sciences have significantly contributed towards achievement of educational objectives and support students in developing analytical and critical thinking skills, as well as skills for hypothesis building, data interpretation, experimentation, etc. [1]. While in the past this contribution has been a consequence of the nature of information that was taught in natural science classes, today the development of socially significant skills and knowledge which form “life skills” has become a priority. Nowadays the focus is on the need of actively involving students in the educational process, as well as change in the educational environment and the role of the teacher. Constructivist approaches are seen as an opportunity to turn this need into reality [2-4]. Their main goal is to teach students how to learn by giving them opportunities to assess themselves and to take responsibility for their educational experiences. This supposes a different, democratic educational environment where students are actively involved in the educational process; the activities are interactive.
and focused on the student; the teacher manages an educational process in which students are encouraged to be responsible and autonomous [5]. There are different notions of the role of the teacher in a constructivist classroom – from a guide who only provides the environment in which students construct knowledge based on their previous experience, to a partner, who works with students to help them discover and become aware of relationships between different branches of science [6-8]. To realize such a constructivist environment in the study of natural sciences, the teacher often chooses activities connected to: a) laboratory session – students themselves plan and organize the experiment instead of following instructions; they work together, discuss and present their results and conclusions – learning by research; b) research projects – groups of students research a topic, look for sources, find useful information and summarize it, and present the results in front of the class – project-based learning; c) class discussions. These techniques are widely used in all constructivist classrooms, and problem-based learning is extremely suitable for them. A certain way of school environment improvement with these techniques is the use of appropriate formative assessment and, more particularly, self-assessment on the student side.

According to many researchers, self-assessment enhances the self-regulation skills of students along with their academic achievements because it focuses on assessing the quality of work based on proofs and detailed criteria [9,10]. This notion supposes that self-assessment is goal-oriented which requires active participation from students and development of certain skills [11]. In their research, Jacobson and Vico show that students who had the chance to apply self-assessment in chemistry classes have significantly higher results than students from the same school who did not have this opportunity [12]. These authors report extremely improved student motivation and independence.

The aforementioned notions pointed us towards development of specific activities and instruments for development of self-assessment skills through realizing the three approaches: learning by research, project-based learning and problem-based learning in natural sciences. The proposed strategy obeys the following principles: a) orientation towards learning objectives; b) integration in the learning process and perseverance; c) basis on criteria that were developed together with the students and students find them clear; d) inclusion of team task as a way of bringing the class closer together instead of separation of students on the basis of achievements and skill levels; e) variety in tasks; f) focus on what students are able to do and positive messages; g) avoidance of grade by not using the grade scale.

3. Methodology of the research

The research was conducted with 30 students from 5th and 6th grade of “Georgi Benkovski” Primary School, Mirkovo, Bulgaria. During the 2013-2014 school year they studied the integral subject Science. In the first school term all the presented constructivist methods were applied, with the exception of self-assessment as a manner of formative assessment. All the self-assessment techniques were introduced in the second school term. The main instruments used in the research are: rubric, tracker, exit slip, reflection diary, video diary. The rubric contains the criteria for assessment of learning activities, as well as examples of good and bad execution of these criteria. The tracker tracks the progress of each student on each learning objective. It is visible by everybody in the classroom. The data in it is filled in by a teacher or students who have this task. Each student can have a personal tracker in which they themselves fill in the results of their self-assessments. The exit slip includes questions and problems, the aim of which is to check the extent to which the students have achieved the objectives for the given lesson. In this research self-assessment is often used as a form of an exit slip. In the reflection diary every week each student has to answer questions connected to assessment of his or her activity. The video diary supports the analysis a student does of the laboratory experiments or presentations that he or she executed.

4. Research results and discussion

4.1. Self-assessment in the lab classes

The aims of regular usage of learning through laboratory experiments are to develop skills for: experiment planning, laboratory safety, data interpretation and working in groups. During the first school term the teach-
er is the person who uses the rubric to evaluate students after every class with experimental work (table 1). In the course of the second school term the students get that responsibility. The aim is for them to become more autonomous and to realize that a person learns and develops his skills through conducting experiments. At the end of class and according to the rubric each student fills in an exit slip with traffic light colours according to the criteria above. Students assess their strengths and areas of improvement. The research data are collected in trackers. The analysis of results from the two school terms shows that regular use of experiments is effective because 80% of students raise their results in these skills with at least 15% in the first school term. When this approach is combined with self-assessment, all students make a progress of at least 20% in the skills tracker during the second school term.

Table 1. Rubric for self-assessment of work on laboratory experiments.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent (2 p.)</th>
<th>Intermediate (1 p.)</th>
<th>Unsatisfactory (0 p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning the experiment</td>
<td>The student sets a clear goal, chooses appropriate experimental techniques, manages his or her time well and reaches results</td>
<td>The student reaches results but does not manage his or her time well, or does not set an appropriate goal that the results answer</td>
<td>The student does not reach meaningful results because he or she has set inappropriate goals, does not manage his time well or does not use appropriate procedures</td>
</tr>
<tr>
<td>Executing the experiment</td>
<td>The student follows all the rules from the safety work poster in the lab and leaves his workplace clean and in order</td>
<td>The student does minor violations of the safety rules or leaves his workplace disordered and not very well cleaned</td>
<td>The student seriously violates the safety rules and leaves his or her workplace in bad shape</td>
</tr>
<tr>
<td>Analyzing the results</td>
<td>The student has well described experimental results and uses them to reach correct and clear conclusions</td>
<td>The student has experimental results and uses them to reach logical, but not well justified conclusions</td>
<td>The student does not reach results because of the lack of appropriate experimental results or their incorrect interpretation</td>
</tr>
</tbody>
</table>

4.2. Self-assessment in the “Project-based learning” method

In project-based learning students split into groups of 3 to 6 people who work together for a long time to create a science project. The teams have the responsibility to choose the project topic and to find the information they need, as well as to plan and realize an appropriate experiment or to build a model which corresponds to their topic, from suitable materials (table 2).

Table 2. Rubric for self-assessment of project work

<table>
<thead>
<tr>
<th>Criteria</th>
<th>excellent (3 p.)</th>
<th>good (2 p.)</th>
<th>satisfactory (1 p.)</th>
<th>weak (0 p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of the information presented</td>
<td>The statements in the project are scientifically sound and they build on the topics studied in class</td>
<td>All statements in the project are scientifically sound</td>
<td>There are minor inaccuracies</td>
<td>There are significant factual and scientific errors</td>
</tr>
<tr>
<td>Multi-disciplinarity</td>
<td>The project includes problems that were studied in chemistry, physics and biology</td>
<td>The project includes problems studied in two of the subjects.</td>
<td>The project includes problems studied in one of the subjects.</td>
<td>The project is not connected to the problems studied in one of the subjects.</td>
</tr>
</tbody>
</table>
**Development**

| The team developed the topic, the experiment and found sources for the realization of the project on their own. |
| The team developed two of the components on their own. |
| The team developed one of the components on their own. |
| The team did not develop any of the components on their own. |

**Presentation**

| The team has an interesting stand, experiment and a quiz for the guests. |
| The team misses one of the listed components. |
| The team misses two of the listed components. |
| The team does not have any of the components. |

Self-assessment here is more of a process. This is the reason why in this case a reflection diary is used. The three questions each student has to answer are: a) Which are the three actions I did that helped my team to succeed most in the last week? b) What can I change in my behaviour of work to help my team most effectively in the following week? c) Which event of the last week made me happy that I work on that project? On the first page of each reflection diary is the rubric. The idea is that students use the criteria for excellent work when they answer the questions. It is compulsory to answer all questions which points students toward positive thinking. In the beginning they find it hard to focus only on their own actions instead on their fellow students, but they quickly get used to this rule. Keeping a reflection diary turned out to be a powerful instrument for developing students’ self-assessment skills, because 95% of the grades students put on their projects completely matched the teacher’s. The positive side of the diary is that both teacher and student have written record of each student development and they can easily find what led to a particular progress or digress. Diaries are also useful when there are parent-teacher meetings. Some setbacks are complexity and the necessity of strong motivation on the student side to keep the diaries diligently.

### 4.3. Self-assessment in the “Problem-based learning” method

A comparatively easy way to conduct problem-based learning is for problems to be given as homework. This approach is used and the effect on the presentation skills of students is accounted for. Each week students get two or three real-life problems. The solutions are presented in front of class, and every solution is presented by a different student. The whole class monitors how students present according to the presentation skills rubric (table 3). The averaged results are then filled in a tracker without names – the development of this skill is tracked for the class as a whole. Each student has the opportunity to enter his result in their own reflection notebook. Also, presentations are recorded and the class gets a video diary. The students who have presented in a particular class have the task to watch the video of their presentation after class and to assess themselves using the rubric. The opportunity to receive feedback from their classmates, to observe their actions on video and to have a common class tracker led to 45% improvement of the average result of the class for presentation skills in 5th grade and 38% for the 6th grad. The video diary as a self-assessment form is irreplaceable because the student has the opportunity to see himself through other people’s eyes, which makes him a lot more critical.

Table 3. Rubric for self-assessment of presentation skills.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>excellent (2p.)</th>
<th>intermediate (1p.)</th>
<th>unsatisfactory (0p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speaking style</strong></td>
<td>The student speaks loudly and clearly and uses correct terminology.</td>
<td>One of the requirements is missing.</td>
<td>Two or more of the requirements are missing.</td>
</tr>
<tr>
<td><strong>Body language</strong></td>
<td>The student stands confidently in front of the class, uses appropriate gestures and has good contact with the public.</td>
<td>One of the requirements is missing.</td>
<td>Two or more of the requirements are missing.</td>
</tr>
</tbody>
</table>
5. Conclusion

The results of the conducted research show that the switch of students’ perspective towards themselves and the search for answers to the questions “What do I know?” and “What am I able to do?” gives a new meaning to learning. It also changes their attitude towards assessment – they see it as a need and a necessity, which can be considered personal growth on their behalf. The efforts towards formation of self-assessment skills strongly supports the role and significance of constructivist approaches applied in the classroom. The developed and tested methodology will be used in the training of pre-service and in-service science teachers in Bulgaria.

Acknowledgement: The financial support by FP7 program of EU (project BeyondEverest) is gratefully acknowledged.

References


Speaker:
Vladimir Tzvetkov - graduated from a Bachelor program in Chemistry in 2012 and a Master’s program in Chemistry Teaching in 2014. After additional training by the foundation “Teach for Bulgaria”, for two years he was a teacher in Natural Sciences to students aged 9 to 14 in “Georgi Benkovski” Elementary School in the village of Mirkovo, Bulgaria. Vladimir is currently pursuing a second Master’s degree – the Erasmus Mundus in Industrial Management in Madrid, Milan and Edinburgh, and meanwhile continues working on the topics of constructivist approaches in the science classroom.
TALETE TOUR:  
Math&music, maths&reality: challenging connection  

Erika Gerardini  
AIM Agency for Interculture and Mobility / Italy

TALETE PROJECT has been a discovery for schools and youth organizations in Italy and is still an ongoing process which generates different pathways of experimentation: between formal and non formal education, technology and human relationship, maths, reality and arts.

During 2-years project, after the first part of research and definition of tools such as the platform and the app to be downloaded with tablets, TALETE entered the world of education thanks to the energy and creativity of a team of young people, the non formal trainers of AIM Agency of Interculture and Mobility which I have the pleasure to coordinate and support. AIM team designed a an important action of dissemination and exploitation of project results, the “TALETE TOUR Challenging Connections” and proposed to different schools in 3 regions to welcome a group composed by a facilitator, main coordinator, an expert in technologies and arts, also facilitator and 2 musicians, one of them mathematician. During 2 weeks they travelled, low cost and passing from the North to the South of Italy with instruments and their competences in TALETE tools. The team brought to several schools a lab called “Maths and music, maths and reality: challenging connections” lasting 4 hours where students of secondary school and teachers together, but also school directors could experiment interactive tools, the web-platform and the app mixed with non formal education approaches created for the occasion. TALETE TOUR has been a strong experience and had the main aim to raise up the project results to the field, the educational world, experiment and taste tools, bring also the human contact and non formal education where in formal context. a great opportunity to be replied and to be fostered at national level. TALETE tools can be a strong starting point to make visible what is already a reality: the connections among maths, sciences, human contact and arts. Which is strong in reality and among youth, which is appealing but is totally missing at school!

When a European project enters in a team, especially if young people, it generates change and bring energy since the very beginning but for TALETE project we can say that TALETE effects are still moving inside our lives. It started as a partnership among international institutions coordinated by Marconi University in a very SMART and excellent way. They are a big institution in Rome and we are a group of young people experts in non formal education working for SPAZIO EUROPA, the European Public Space dedicate to the European Education. TALETE has been the first main challenge as we could learn how a multilateral project can be implemented and how can change direction along the process. at first approach it was a project based on the experimentation of a platform for students and teachers on maths and geometry, a very innovative 3D game and at the end we realized an app. AIM works with several schools in Italy, we are partners of the National Natwork of Schools “Educate to Europe” and we saw that at the end of this pathway something was missing. We had very important digital tools, networks of teachers, enthusiastic teachers and students, a team of experts etc...but we searched something more. Experience and more experimentation. Mobility and human contact. We proposed to the coordinator a special dissemination project inside the project. We brought TALETE inside schools in our way: with a non formal lab called “TALETE TOUR: Math&music, maths&reality: challenging connection” mixing maths and music, maths and art”. We can say: maths and reality. We could finance just a tour in 3 regions but we moved people from the North to the South. The team

When...
was extraordinary: our project manager expert in new media and graduated in arts, a facilitator expert in non formal education, a musician playing violin who is also a mathematician and a musician playing cello also anthropologist. The younger has 24 years old, the oldest 34 but all professionals and experienced in their filed. Not experienced in what is the real situation of the Italian schools: TALETE is a challenging and innovative project which fosters a strong use of media and technology but schools the most are still not prepared and we, as italian culture, we should say, the southern warm, we prefer first to have a human approach. TALETE TOUR started from this point to promote and spread the culture of use of media.

TALETE LAB heart has been the connection with maths and reality which is visible through examples and creating links with the daily life.

The activities were thought for children between 14 and 16 years old so it put in connection secondaries schools and support the passage from the mandatory school to the secondary school where they have to decide which is the best way. Key competences in science and technology which are the future and the field to work on to find a job. TALETE TOUR has been SMART, colourful and dynamic but also concrete and extremely linked with the real life. During the lab teachers were there and interact, school directors the same, they experienced the same as was completely new. The Italian school is old! But TALETE brought innovation and, even if it didn’t reached an high number of schools, the impact was great and we went on using results and feedbacks to apply for other projects and propose activities also without the EU budget.

TALETE is still going on and the team is cooperating. Schools are still asking to welcome the project and what we learn the most is the confirmed strong need for the formal world of education of non formal techniques inside schools. the need of young people and youth energy. the need of change.

I could write more and more about the changing process that European projects are bringing and competence based learning is the key for successful students, schools wellbeing and education improvement. TALETE has been a small example inside a great international project and after or in the meanwhile many other projects have been crossing our lives but we strongly believe that maths and reality, maths and arts or music are the real protagonists of this speech and we should focus on what should be education for all: multisectorial, transversal, technical and artistic, formal and non formal, digital and human. But first of all education should do like TALETE: improve the use of lateral thinking and create something that is challenging and educational at the same time.

http://www.taleteproject.eu/
https://www.youtube.com/watch?v=Tf808KEkfyg
https://www.youtube.com/watch?v=aM45uXg_xik

Speaker:

Erika Gerardini, president and legal representative of AIM Agency for Interculture and Mobility of Rome. Graduated in foreign languages, she started to work in the field of European project management and youth mobility in 2005 in the city capital and travelled along the years taking part to international meetins, conferences and trainings.

For 3 years she worked for the Italian National Youth Council. Since 2011 she is responsible of the development of the training and facilitation program for SPAZIO EUROPA the European Public Space. She coordinates a team of trainers expert in European affairs and using non formal education techniques with schools and civil society.
Le-MATH: Learning Mathematics Through New Communication Factors

Gr. Makrides and project Le-MATH partners*
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www.le-math.eu; www.cms.org.cy

In this paper we introduce the guidelines for the two methods developed by the Le-MATH project, that is the MATHFactor and the MATHeatre methods. The guidelines are developed based on the collection and study of good practices in more than 10 European countries and they are available in 10 EU languages. Many pupils as well as parents consider mathematics to be a difficult and boring subject. Instead of studying mathematics (or other subjects) many students prefer to spend most of their time by watching TV, playing video games or on their mobile devices sending texts, pictures and videos. One way to bring pupils back to the “playing field of education” is to employ the use of similar tools - “weapons like the opponents”, in order to communicate the learning of mathematics in a non-traditional way, like a game through theatre or competitions similar to the well-known X-Factor and other. The Le-Math project, funded by the European Commission and coordinated by the Cyprus Mathematical Academy with 12 participating partners, undertook the creation of these tools, in the period from November 2012 until its completion in October 2014.

1. Introduction

Many students claim that mathematics is often too abstract and therefore difficult to understand. As a result, this project developed different and innovative approaches by inviting teachers and pupils together to apply new communication methods in the learning of mathematics, which could be fun and enjoyable at the same time. An approach, that brings new ideas in the context of “play and learn.”

This European project developed a new methodology for the learning and teaching of mathematics to students aged between 9 and 18, which subsequently can be used in any school environment. It will also make learning more attractive and enjoyable for all students and it will strengthen their skills for creative thinking. These methods could be used in other subjects of the education curricula, as well as for other age groups.

The consortium comprises partners from universities, schools, mathematics associations, foundations, theatre schools, art schools and enterprises.

The project activities contribute to the Education and Training 2020 as it is enhancing creativity and innovation among youth. It also contributes to the benchmark for decreasing low-achievers in basic skills (mathematics and science) to 15%. It promotes the European Cooperation on schools in fundamental aptitudes, by supporting the key competence for mathematics.

2. Objective

The aim of this project was the development of a methodology in the teaching and learning of mathematics, with the creation of two main tools that can be used by teachers. The methods were created in such a way so that they can be used in an in-service training course for teachers who teach mathematics to pupils of age 9-18.
The two methods are:

A. MATHeatre: Teaching and learning mathematics through math theatre activities
B. MATH-Factor: Teaching and learning mathematics through mathematics communication activities

These methods are expected to be able to compete with the interests and the activities of the students belonging in the aforementioned age group, outside the school system. The project is being developed through nine work packages. Below follows a description of some of them.

3. **Good Practices in the European Space**

In this work package we collected practices relevant to the subject and we developed them in an e-book. In this electronic manual one can find current or past activities. The final version of the manual can be found on the website of the project www.le-math.eu.

4. **MATHeatre Method**

The Math Theatre follows the same rules of a normal theatrical play, but with the content of the play directly related to mathematics and with the actors being students between the age 9 and 18. It can have all the forms that characterize theatrical plays such as drama, comedy, musical etc. and the central plot can be based in any mathematics related subject from the school curriculum or from the history of mathematics. The difficulty of this activity lies in the fact that the dialogues of the actor-students must pass some mathematical knowledge to the audience. For supporting this part the project developed a Manual of Scripts for MATHeatre, so teachers and pupils can use in developing their own theatre play for communicating mathematical learning.

The “MATHeatre Guidebook”, is published on the project website, which contains the guidelines and the accompany tools. The electronic publication is presented in two different forms, one with the tools attached as links and one self-contained interactive book. A competition was launched through the project, for the writing of such plays and the submitted plays are published in the Manual of Scripts for MATHeatre. Furthermore, the project published theatre play dialogues in mathematics especially for the age group 9-12, called “Mathematical Stories for Theatre”.

During the second year of the project, a European competition with international participation, titled MATHeatre EUROPE 2014 was launched. Schools, organizations or groups of students were eligible to participate, by applying the first draft of the guidelines published in September 2013 and preparing a play of a total duration of 5-12 minutes, with 2-10 participating actors. During the first phase of the competition (Sept. 2013-Feb. 2014), the participants had to upload their theatrical play on the Le-MATH platform. After the first evaluation process the best participants of two different age groups (9-13 and 14-18) were invited as finalists. The finals were held during the EUROMATH student conference on the 24-28 of April 2014 and the results are published on the project website.

The evaluation criteria of the math theatre are published in two different forms; one for activities within the school environment and the other for open public competitions like MATHeatre Europe 2014. Evaluation criteria are flexible to be adapted to different education systems.

5. **MATHFactor Method**

The MATHFactor is an individual activity of communication related to mathematics, in the sense that a student will have to prepare and explain within a short time of 3 minutes, mathematical concepts, theorems, applications, or aspects of the history of mathematics etc., in a simplified manner so they can be understood by non-experts or students of same age. During the presentation the use of interactive projection tools and the blackboard is not permitted, but the student may use small visual objects that can be carried using one hand.
A good presentation will be evaluated based on the high articulation of the participant and his/her ability to impart knowledge to the audience, the presentation of mathematical concepts, for its content, its innovative approach in presentation and the talent exhibited to the viewer.

The whole approach it is based on the well-known TV game X-Factor, but it is centered on mathematics instead of singing. This method could be used as an educational activity within the classroom and/or in open public competitions.

6. Experimentation and Evaluation

The experimentation and evaluation process took place in different phases and levels.

MATHeatre EUROPE 2014
MATHFactor EUROPE 2014

The whole effort was based on an international level competition. Participants were divided into two different age groups (9-13 and 14-18), in order to better serve the overall aim of the project and in order to give the necessary incentives and spark the interest of both students and teachers. The first phase of the competition opened on September 2013 and closed on February 7, 2014, with the participation possible via online submissions. After evaluating of the online first phase the finalists were invited to participate in the live international finals which took place during EUROMATH 2014.

During this process, the involvement and the activities of the students were evaluated, as well as the role and the impressions of the teachers that supported the effort. Additionally, their comments and remarks regarding the first draft of the guidelines were taken into account.

The international finals were also assessed and the results are used for improving the procedures in 2015 as well as supporting sustainability. Additionally, the results were used for improving the guidebooks for the MATHFactor and the MATHTeatre methods as well as the transparency of the procedures.

The evaluation report is published on the project’s website in the listing of outcomes.

An important part of the project’s sustainability is also the creation of a five-day training programme for teachers, which is offered as a training course open for participation through funding provided by the ERASMUS+ KA2 programme managed by the ERASMUS+ National Agencies of the programme countries.

7. Exploitation

From September 2014 the project Le-MATH published the final version of the Guidebooks 2014-2015 and the competitions MATHeatre Europe and MATHFactor Europe 2015 inviting teachers from all over Europe and beyond to apply the methods and use the competitions as incentives to attract the interest of their students. Letters to all Ministers of Education in European countries and beyond are sent inviting the Ministries to support local regional or national competitions using the fact that winners of such competitions earn a place to the finalists of the final international competitions. Those interested to apply directly are invited to participate in the two Phases procedure through the Le-MATH platform. Phase I is the online submission of their video and if approved to be invited to the finals. The international finals will be held during the EUROMATH 2015 student conference on the 25-30 March 2015 (www.euromath.org).

Speaker:

Dr. Gregoris MAKRIDES, holds a Ph.D. in Applied Mathematics from the Illinois Institute of Technology (IIT) in Chicago, USA. He worked as a teacher trainer at the Cyprus Pedagogical Institute (1995-2000), as the Dean of Enrolment Management at the University of Nicosia(2000-2006) and since 2006 is the Director of Research and International Relations at the University of Cyprus and in parallel the Executive Director of the
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In this article, the EU funded project “Art in Education - A new approach to education using the arts” (ARTinED henceforth) (ref. no: 518649-LLP-2011-IT-COMENIUS-CMP) is presented. The introduction section enlightens the readers about the rationale of and background to the project. This is followed by, in order, the aim of the project, partnership, project outputs and piloting.

1. Introduction

The common view among primary school teachers is that using art in classes raises student interest and participation. Nevertheless, this endless resource is largely underused by them because they are too busy with preparing their students for state mandated achievement tests, and most of the time art classes are sacrificed so that students can concentrate on academic subjects. Students, on the other hand, struggle to achieve success in the educational system which usually ignores individual differences, does not foster creativity, and which is heavily biased towards linguistic modes of instruction and assessment. Because this current "one-size-fits-all" education system cannot meet the varied needs of students in the classroom and does not support a student’s creative abilities or self-expression, it usually results in a high number of low-performers and early school leavers.

It is now widely accepted that the growing diversity of students in today’s classrooms necessitates changes in the current theory and practice of teaching. As highlighted in Gardener’s (1983&2006) Multiple Intelligences Theory, each person has several ways in which s/he learns best. In the updated version of his theory, Gardner (2006) identified eight multiple intelligences: linguistic, mathematical/logical, naturalistic, spatial, bodily/kinesthetic, musical, interpersonal and intrapersonal. He argued that these intelligences are found in all people, but each person usually excels in only one or two of them. Thus, with the educational system that relies on linguistic modes of instruction and assessment, teachers are faced with the challenge of reaching the needs of students with different intelligences.

Research into the use of arts to teach curricular subjects has indicated that the arts (music, dance, drama, fine arts, etc) are excellent vehicles to enhance understanding because students can remember the content far longer than would be expected through conventional teaching methods (See Lerman, 2003; Alrutz, 2004; Fleming, Merrell & Tymms, 2004; Dorion, 2009; Erdoğan & Baran, 2009; Sarıçayır, 2010). The idea is that when students study a subject through a form of art, they can undergo a holistic experience with their mind by symbols, with their body by the senses and with their heart by the feelings. So, they can learn and retain the content better as they can remember the images and feelings for a long time instead of the words that they will forget in a short time.

Given these circumstances, it seems plausible to conclude that teachers can benefit greatly from integrating arts with different school subjects as they include it in daily instruction without allocating time for separate art classes. This approach is also beneficial for students because it enables them to think more creatively, to love learning and participate actively in the learning process. ARTinED is an educational project to enhance teachers’ knowledge and confidence in using arts in their teaching. The project has developed an innovative methodology to improve the teaching of any primary school subject using five forms of art-creative writing, music, drama, dance, and visual arts.
In ARTinED project, in harmony with Elbert Hubbard’s (an American writer, publisher, artist and philosopher) claim, art is not a thing; it is a way. In this sense, the project meets the needs of those teachers who feel that there is no time to include art in daily instruction because of the needs and benchmarks that are to be met in other school subjects.

2. **The aim of the project**

ARTinED project has created an innovative methodology and an in-service teacher training program for stake-holders (teachers, authority curriculum experts) to enhance European teachers’ knowledge and confidence in using arts in their daily teaching and to improve the teaching of any primary school subject by using five forms of art, i.e. creative writing, music, drama, dance, and visual arts. More specifically, the aims of ARTinED project are as follows:

- To introduce an innovative teaching methodology for primary schools to teach all subjects using the arts,
- To enhance the ability of young European students to be creative thinkers,
- To use the arts to enhance transversal competencies such as learning by doing, building a sense of initiative and confidence in learner,
- To support the development of innovative ICT-based content, services, pedagogies and practice for learning,
- To help young people acquire the basic life-skills and competences, necessary for their personal development, for future employment and for active European citizenship,
- To improve the quality and to increase the volume of mobility involving educational staff in different Member States (through attendance in In-Service teacher training courses),
- To improve the quality and to increase the volume of partnership between schools in different Member States.

3. **Partnership**

ARTinED project has been carried out by the following consortium who provided complementary expertise required for the realization of the project aims:

- Fondazione Nazionale Carlo Collodi, Collodi from Italy - Literature and creative writing,
- The Mosaic Art and Sound from the UK - Music and drama,
- Viksjöforsbaletten, Viksjöfors from Sweden - Dance,
- Liceul de Arte Dinu Lipatti, Piteşti from Romania - Visual Arts,
- Confederación Española de Centros de Enseñanza, Madrid from Spain - Poetry,
- Çukurova University, School of Foreign Languages from Turkey – Environmental Education
- Kindersite Ltd, from the UK - Dissemination

4. **Project Outputs**

In order to realize its aims, ARTinED project has created the following outputs which are available on the project website:

- Repository: The repository provides 91 references (academic and non-academic literature, EU funded LLP projects, research projects, web resources, PhD theses and other) to research on the use of the arts to teach curricular subjects.
- Background report: The report provides reasons for and benefits of integrating each art form in the teaching of curricular subjects and explains how to do it by using specific examples in several subjects. A list of references is provided at the end of each section for further information.
- The ARTinED methodology: It is based on relevant academic literature about how to integrate arts into the teaching of curricular subjects. It focuses on how to teach environmental education. Environ-
mental education is chosen for the methodology because it is a cross-curricular subject and enables the project to give examples in a number of subject areas. The lesson plans and an example set of activities focusing on environmental education have been prepared.

- Use case scenarios: They give examples of how to integrate different forms of art (dance, music, drama, creative writing and poetry, visual arts) into the teaching of maths, science, and languages at primary education level. It is thought that the ideas will inspire primary school teachers to use the ideas or even better, their own ideas.
- Best practice case study reports: They are based on students’ and teachers’ experiences. They describe the process undertaken to arrive at good results. They can be used to enhance understanding of the ARTinED methodology.
- In-Service Teacher and Curriculum expert Training Course: The course which comprised 40-hour teaching was built on all materials produced during the project phases. It was delivered twice in Spain, at the Spanish Confederation of Education and Training Centres (CECE), and in Italy at Carlo Collodi National Foundation. The course has been included in the EU In-Service Comenius Catalogue which gives the project a concrete sustainability.

5. Piloting

ARTinED methodology has been piloted in eight primary schools across Europe (United Kingdom, Italy, Spain, Sweden, Romania, and Turkey). Piloting has been carried out in three phases.

The first phase lasted for 10 hours (excluding the preparatory meeting with the teachers, artists and trainers). 13 teachers and 219 students with ages between 7 and 12 took part in the first phase, which was dedicated to the creation of the artistic production on water as the major subject and soil as a minor subject. Each responsible partner piloted its own art form; Children created and delivered art performances in music, dance, visual arts, drama, poems, and creative writing, and learned about water and soil as natural resources. The piloting tasks were designed for classroom collaborative work.

The second phase lasted for 8 hours and consisted of an exchange among the schools of their artistic production. Children uploaded parts of their artistic productions in the virtual community space (ARTinED wiki) to share with the pupils in other countries.

The third phase consisted of the final event which lasted no more than 45 minutes. Students, parents, teachers, local important people, and media were invited to the event. The audience was informed on the ARTinED learning activities which were to teach curriculum subjects through arts, and the European dimension of the project.

Both teachers and students who took part in piloting were given pre and post questionnaires. The piloting results show that teaching curricular subjects through music, creative writing, fine arts and dance enhances students’ learning, improve their current knowledge and skills, and makes the lessons more attractive. The results also show that arts can be used to teach any curricular subject, and students and teachers do not need any specific artistic skills in order to learn or teach curricular subjects through arts.

References


Speaker:

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Dr. Eda Kahyalar- Dr. Eda Kahyalar is a lecturer of English at School of Foreign Languages, Çukurova University, Turkey. Her current research interest focuses on investigating the role of teachers’ corrective feedback in second language writing. She is also interested in teacher education and individual differences in adult second language learning.
Children facing risk and disadvantage in their development, such as poverty, social exclusion, family instability, disability and learning difficulties, need to be equipped from an early age with the requisite skills to overcome the challenges and thrive despite such adverse circumstances in their lives. This paper describes an EU project on the development of a resilience curriculum for early years and primary schools in Europe. The curriculum is developed on the basis of the current social, economic and technological needs and challenges in Europe, and seeks to develop in learners the requisite competences needed to overcome the challenges in their lives to achieve academic success and social and emotional wellbeing as young citizens in the EU. It takes a developmental, inclusive and culturally-responsive perspective, with activities reflecting the diversity of learners, particularly vulnerable children. The key competencies promoted in the curriculum include developing a growth mindset, developing and making use of one’s strengths, developing self determination, including problem solving, decision making, and self-efficacy, developing effective communication skills, building and sustaining healthy relationships, and overcoming and dealing with challenges and obstacles, such as bullying, loss, failure and rejection. This paper presents and discusses the curriculum framework including the key principles, processes and themes of the curriculum.

**Keywords:** resilience education, early years, primary school, competences, wellbeing

**Resilience in education**

Resilience may be defined as successful adaptation and growth in the face of adversity and stressors, such as poverty, unemployment, homelessness, and family instability and breakdown (Masten, 1994). Successful adaption may include the presence of positive academic and social behaviour, absence of undesirable behaviour, and good external and internal adaptation. Resilience is not for the select few or the super kids, but ‘ordinary magic’, that is, “ordinary responses which focus on strengths” (Masten, 2001, p.228). It is not simply an individual, innate characteristic such as stress resistance, but a quality which can be nurtured and developed from a young age. Development is the result of the dynamic interactions between the various systems impinging on the child’s life (Bronfenbrenner, 1989), and it is the interaction between the child and his or her environment, including the family, the community, the peer group and the school, that finally determines the adaptive process (Benard, 2004; Pianta and Walsh 1998). Studies on disadvantaged children and communities (eg. Werner and Smith, 1992; Rutter et al., 1998) found that despite the high-risk environments in which children grew up, the majority developed into healthy, successful young adults. Protective factors had a stronger impact on children’s development than the risk factors.

As one of the major systems impinging in children’s lives, schools are ideal places to help children develop resilience skills, particularly vulnerable and disadvantaged children (Goleman, 1995). Helping children to understand their and others’ emotions, increase empathy, build healthy relationships, develop self determination, autonomy, and self-regulation strategies to manage negative emotions, as well as improve problem solving
and decision making skills, are all significant competencies which schools need to include in their curriculum and teach them systematically to all students (Cefai and Cavioni, 2014; Elbertson, Brackett & Weissberg, 2010, Elias, Zins, Weissberg, Frey, Greenberg, Haynes, Kessler, Schwab-Stone, & Shriver, 1997).

**A resilience curriculum**

In seeking to develop a resilience curriculum for early and primary schools in Europe, a framework was developed underpinning the key principles informing the curriculum and the processes set to lead to a process of becoming resilient. The curriculum is based on a European perspective, reflecting the strengths and needs of European society. While based on a European identity, it also reflects European diversity, with activities addressing cultural differences across Europe. It is responsive to the needs of the individual learner differences, underlining the right of all learners for a quality education, and a commitment towards social justice with awareness of the risks of discriminatory practices due to individual educational needs, minority statuses, and poverty amongst others.

The curriculum is organized as a universal and inclusive, intervention programme, targeting all children in the classroom, but with activities reflecting the diversity of learners, particularly vulnerable children coming disadvantaged backgrounds such as Roma children, migrant children, children living in poverty, and children with special educational needs. Such children are more likely to experience amongst others, weaker family support, prejudice and discrimination, limited learning opportunities and access to health care, negative life events and, bullying, exclusion and isolation (EC 2012, Simões, 2012; UNICEF 2005). The curriculum seeks to promote resilience assets for positive development and active citizenship of such children by fostering their internal resources such as self awareness, problem solving, optimism and positive attitude, adaptability, perseverance, belief in inner strength, self efficacy, sense of purpose, high academic expectations, empathy and collaboration, as well as their external resources such as caring relationships and meaningful participation at home, at school and in their peer group (Benard, 2004; Cefai, 2008; Dimakos and Papakonstantinopolou, 2012; Hutchinson and Dorsett, 2012; King, 2004, Matsopoulos, 2011; Simões, 2012).

The curriculum makes provisions for regular teaching of resilience education as a core competence in the early years and primary school curriculum, making use of direct teaching of evidence-based and developmentally and culturally appropriate resilience competencies with application to real-life situations. This necessitates a set curriculum and available resources to support consistency of delivery, one of the key criteria of programme effectiveness (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Collaborative for Academic, Social, and Emotional Learning 2008). It follows the SAFE approach, that is, it is sequenced, active, focused and explicit. Research on the effectiveness of resilience and social-emotional learning programmes, provides consistent evidence that effective programmes adopt sequenced step-by-step approach, make use of experiential and participative learning, focus on skills development and have explicit learning goals (Durlak et al. 2011; Collaborative for Academic, Social, and Emotional Learning, 2005). A developmental approach strengthens and builds on basic skills from one year to the next, building on what pupils have already learned, and equipping them with skills needed for different stages in their development. Six major themes spiral from one year to the next at higher levels of complexity. These include developing a growth mindset (optimistic and positive thinking and positive emotions for growth and wellbeing), building of strengths (positive self concept and self esteem and use of strengths in academic and social engagement); developing self-determination (creative problem-solving and decision making, and sense of autonomy, self-efficacy, and internal locus of control); enhancing communication skills (interpersonal communication and assertive behaviour); building healthy relationships (establishing and maintaining healthy and rewarding relationships and engaging in ethical and responsible behavior); and turning challenges into opportunities (developing courage and persistence to in the face of failure, injustice, and adversity; dealing with rejection by peers and adults; dealing with bullying behaviours in school; dealing with family-related stressors such as conflict, divorce, and unrealistic expectations; and dealing with change, loss and transitions in life). The curriculum is also be infused in the other academic subjects of the curriculum, thus enabling the generalization and internalization of those competencies (cf. Diekstra 2008; Elias and Synder 200), while there will be also home activities to reinforce the skills being learnt at school. The classroom relationships, pedagogy, activities, resources, and management, also provide a context where pupils can practice and apply the skills learned both in the classroom and outside, such as the playground.
A whole-school approach where the school community, together with parents and the local community, engages in resilience building in all aspects of school life and where the skills addressed in the classroom are promoted and reinforced at the whole-school level in a structured and complementary way, help to create a supportive whole-school context and ethos conducive to more effective resilience outcomes (Cefai and Cavioni, 2014; Weare and Nind 2011). The curriculum includes also a parents’ manual which reinforces the skills learnt at school, and encourage parents adopt the resilience philosophy in parenting their child. A whole school approach also targets the school staff’s and parents’ own wellbeing and resilience. School staff needs to take active steps to maintain their own health, wellbeing and resilience if they are to be effective in their efforts to promote students’ resilience (Beltman, Mansfield and Price, 2011; Howard and Johnson 2004). Similarly, empowering parents and communities not only to engage collaboratively with the school, but to address their own wellbeing and resilience, is another important component in a whole school approach to resilience building (Downey and Williams 2010; Weare and Nind 2011).

Conclusion

The resilience curriculum targets the most vulnerable children in Europe, seeking to promote social justice and equity by equipping such children to overcome disadvantage, adversity, prejudice, discrimination, social exclusion, school failure and mental health problems. It seeks to do so by taking a strengths-based, asset building and resilience perspective, a developmental, inclusive and culturally-responsive stance, and a whole school community approach. The curriculum also seeks to reflect the realities of European children in the twenty first century, while being sensitive to social and cultural diversity. It is also evidence-based, drawing from what has been found to work in the literature, but also being evaluated for its relevance and effectiveness.

References


Speaker:

This paper has been written in collaboration with Paul Bartolo and Katia Galea (University of Malta), Renata Miljevic Ridicki, Dejana Bouillet and Tea Pavic (University of Zagreb), Anastassios Matsopoulos and Mariza Gavogiannaki (University of Crete), Maria Assunta Zanetti and Valeria Cavioni (University of Pavia), Celeste Simoes and Paula Lebre (University of Lisbon), and Birgitta Kimber and Charli Erickson (Orebro University).
Financial Education and Competence-based Learning

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For several years, the Institute for Educational Sciences in Bucharest has participated in the implementation of the school attendance campaign “Hai la Scoala” (Let’s go to school) funded by UNICEF. Within this project, an in-service teacher training program with both core-curricular components as well as extra-curricular ones is provided every year for the teachers who work with the students at risk. The program is centered on addressing the needs of the students who have unstructured learning acquisition. The program also provides teachers with opportunities to share experiences on the eLearning platform, offers them examples and coaching in order to implement new solutions in their class.

During the school year 2013-2014 the teacher training program included financial education as a new topic that all teachers from the UNICEF Campaign could apply for, given its transversal perspective. The results have exceed all expectations since in all the monitoring visits by the UNICEF, teachers ranked financial education at the top of their preferences among the activities in the campaign. The transversal/ transdisciplinary features of the new topic have determined teachers to pay more attention to the local context and the students’ profile as no textbook or prior routine could orient their approach. Consequently, teachers designed activities and projects that developed the students competences within the framework of their local community instead of demanding them to study the nationally approved textbook. Our paper attempts to give some insights into this successful competence-based learning and teacher training experience.

UNICEF has invested for more than 10 years into programs that focus students at risk in Romania. Together with various other education and social partners, the Institute for Educational Sciences in Bucharest has taken part in this UNICEF program from the very beginning. Our organization’s contribution in the school attendance campaign comprises: training and support for the teachers who work with students at risk, for the directors in the schools of the campaign as well as counseling for parents.

Within the 2013-2014 school attendance campaign, the teacher training program included Financial Education as a new course in its offer. Financial education as well as financial inclusion are priorities within the European Union in order to create an integrated market of financial services at community level that should be accessible to all the member states’ citizens [1;2;3].

The main objective of the course focused the training of the participants in order to plan and implement financial education activities at the level of their schools.
From the perspective of the students who benefit from the teacher training the course highlighted:

- an information-based component which is based on fundamentals of financial education;
- the critical reflection on the financial domain and the increasing awareness for this domain;
- an action-based component aiming at developing the responsible behavior towards the financial resources which allows taking roles and responsibilities daily (on short, medium and long terms).

The main topics of the course have been the following:

- Money invention and evolution. Functions of money
- Resources within the family. Family budget. Personal budget.
- Let's better know the national currency
- Currencies in various countries
- Money and exchange. The value of money.
- Income, expenses and savings. Why do we need to save?
- The role of banks in saving money
- How to invest money?
- Project activities/ simple projects on financial topic/ problems

The training focused on the development of the following competences:

- Identify situations where barters take place
- Identify the role of money in facilitating the exchange of goods
- Analyse ways to save
- Explain the role of banks in saving money
- Identify activities in the commercial banks
- Analyse circumstances where money can be invested
- Solve a problem by participating in a simple project

The training course made use of blended-learning interactive methodology. The online coaching and sharing of experiences took place on the eLearning platform training.ise.ro. The Fig. 1 and 2 below show the section devoted to Financial Education at the beginning and the end of our course.

Three components sustained the online interaction: the forum, the resources and the section for the assignments. The Forum was used for discussion and for the posting of the participants’ action plans. Each teacher had to select six topics from the total of ten according to the students’ interests and needs, then schedule them and decide upon the implementation.
The section for the assignments is where participants posted their results and participated in discussions (see Fig. 3). Both the forum and the assignments section were moderated by the trainers. The resources section includes the course materials as seen in Fig. 4.

Challenges for the participant teachers

When teachers facilitate the students’ initiation in financial education they need to organize differentiated approaches in order to meet the particular learning contexts, the students’ needs and interests. The following issues represent the main challenges in implementing the project:
• Develop a personal approach as a follow up to the face-to-face course to thoroughly prepare for the planning of the activities that are not the ordinary ones since most teachers did not have any prior financial training.
• Identify possibilities to implement the financial education activities in schools. If other courses in the training offer relate to the core curriculum and the applications take place within the ordinary timetable, the activities focusing on financial education had to be organized both within school subjects and in a variety of other settings such as: extracurricular activities, the special program during the last week of the term, counselling class/meetings.
• Develop approaches that take into account the students’ needs but which also create new needs. In order to meet this challenge teachers had to highlight the relevance of the new acquisition, i.e. the abilities to be developed must be meaningful for the students’ life (these abilities are needed for people with small and average income).
• Differentiate instruction in order to adapt to the interests of the students at risk.

The analysis of the participants’ questionnaires at the end of the course highlight the following:

• unanimously appreciate the topics of the course and a good appraisal of the methodology;
• understand the value of the online component as an opportunity to share experiences and receive coaching from the facilitators;
• positive comments: the participants made use of key terms such as: stimulating, useful, motivating, interactive, exercise for life, openness.

References [Arial, 11-point, bold]

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Speaker:

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Ligia Sarivan was involved in the curricular reform in Romania in the late 90s. She participated as a curriculum and teacher training consultant in various SEE countries. She works in curriculum implementation and teacher training. Her interests include: key competences development, methodology for the teachers who work with students at risk; ICT and language learning; multiple intelligences in the language class; research partnerships among graduate students, teachers, researchers.
Importance of Combining Theory and Practice in the Higher Education: Working with Socially Excluded People in a University Setting

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Maltepe University Research and Application Centre for Street Children (SOYAÇ) is the first and only centre established at a university for street children in Turkey. All SOYAÇ projects have been carried out with active involvement of undergraduate and postgraduate university students. Students take part in the SOYAÇ projects vary from psychology to fine arts departments and work with socially excluded disadvantaged people. Students' accounts strongly suggest that taking part in such a project contributes not only their professional development but emotional, social, consequently the quality of higher education. Students underline the fact that by taking part such projects they benefit more than the disadvantaged group they work with.

Universities are not institutions that teach theory only, but have to facilitate the joining of the theory and its application in the field to be organised in accord with the dynamics and the needs of the society they are situated in. It is unarguably the obligation of the university to organise the best way to equip the student with adequate professional skills and also to help them develop their personality in the best way to become active and responsible citizens. In this paper, this point is discussed from the viewpoint of both the students and the group they work with with their vivid accounts.

Wyness et al. (2004) have pointed out that there are powerful political and social forces that place children as dependants and exclude them from political participation. They suggested that the relationship between young people and the world of politics is a neglected area within the social sciences and this neglect reflects two sets of assumption. Firstly, that children and young people do not ordinarily inhabit the civic or political sphere; that they can have the political right of voting at the age of 18 and over. Political socialisation, however, is not simply bestowed upon the 18-year-olds. There is no formal sense in which childhood requires a level of social and political maturation. There is little representation of young people's interests at the political centre. The second assumption is that until relatively recently children's view has not counted as legitimate knowledge of the world. Therefore, they have been seen as unable to make judgements on political matters. The participatory approach, however, creates the possibility of children and young people themselves determining the way in which they choose to participate and attempt to contribute to political debate within local national groups, institutions, organisations and services on their own terms, and in their own right.

In the traditional Turkish culture, children and youth are subject to regulation and control. Raising children under regulations and surveillance is a means of bringing children under state control. This, as James (2007) saw it, has to do with the cultural politics of childhood that shape children's everyday lives and experiences.
The concept of governmentality', as defined by Foucault (1991, cited in Holmes, 2002, p.84) is helpful in thinking about bringing children under state control. Governmentality is understood in the broad sense of techniques and procedures for directing human behaviour, involving —government of children, government of souls and consciences, government of a household, of a state, or of oneself (Rosa et al., 2006, p. 83). Foucault's analysis of political power in terms of governmentality implies a deliberate attempt to direct human conduct in order to regulate, control and shape (Holmes, 2002). The principles and practices of government involve the many and varied alliances between political and other authorities that seek to govern economic activity, social life and individual contact. Morris (1998) drew attention to the process of governing at a distance to fully understand the art of government as termed by Foucault.

In order to encourage the young people's political participation Crick (1998) argues that students need to experience citizenship education at school so that they may become a competent citizen in a representative democracy. Furthermore, to become an active and democratic citizen means becoming aware of one's rights and responsibilities and developing the capability for participation in society (Cecchini, 2003).

1. University-Community Partnership

1.2. Collaboration between the University and Other Social Institutions; Social Partnership, Working Together, Learning Together: Youth for Youth project

Youth for Youth project is carried out under the aegis of the Research and Application Center to Support Children/Youth Living and Working in the Streets (SOYAÇ) at Maltepe University in Istanbul, which has been running in collaboration with state-run care institutions for boys since 2010. The approach consists of a peer-based supportive model that provides adolescent boys in care with emotional and social security through attachment relationships they develop with university students. The teaching staff and students of the psychology department constitute the core group running the program, which also includes workshops assisted by teachers and students from humanities departments such as philosophy, drama, and radio.

All the students have frequently emphasized that the project had contributed positively. They have especially emphasized the contribution of the joint activities with the street children to their development as individuals. These gains have been classified as emotional, professional and awareness of and changing attitudes to social responsibilities.

"I cannot think that they have learnt much from me but I have learnt a lot from them. May be these are repeated words but I have to say I have learnt about life because they were children coming right from the interior of life. I have learnt what their ‘outside’ is." (student)

Whereas the university students were expected to be role models for the street children through the close associations established, the street children constituted a role model for the students with their display of emotional and physical resilience under their trying and frequently very severe conditions of survival, which has inspired the students to embrace life more seriously.

"I have witnessed their ability to continue laughing at hardships at least ten times as worse as what we experience. Yet we cry for days and seem to dwell upon small issues. I have seen that strong side of theirs and how they overcome any difficulty. I have been thinking of what I would have to do if, God forbid, I lost my father and my mother. Most of them don’t have a mother or a father but there they stand all alone." (student)

Youth for Youth has been useful in motivating the students to undertake responsibilities for others, and thereby, in preparing them to be socially aware and responsible citizens.

"I am feeling socially responsible and believe that everybody should have the same awareness. Why? Because we live in a society. What is a human being? A being that survives in a social group. Therefore, we are not just responsible for ourselves. We are responsible for our families, and the people living around us. We can be in their situation any time. I could have been a street child. Some of us body have to own them up." (student)
2. Conclusion

Regular supervision and educational support given to the students before and during Youth for Youth Project has helped to create positive motivation and excitement in every student included, which is an important outcome that can be argued to have provided one means to meet a significant lack in the university education in this country in arousing the interest of the student in education. By equally empowering both the university students and the street children, have drawn them into collaborative activities, and has given them a unique opportunity to learn from each other as well as to become mutual role models.

It is necessary, not only for those students of psychology but students from all other disciplines, to associate with members of different groups in the larger society in order to gain skills to solve problems, to cope with and to arbitrate in difficult circumstances and to empathise with others.

References


Maltepe University Research and Application Centre for Street Children – Joint Projects with Children
https://www.youtube.com/watch?v=tLZqc5hRYWI#t=94

Speaker:

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Digital age poses serious challenges to chemistry teachers. A good teacher should be proficient in chemistry, pedagogy as well as technology. The framework Technology Pedagogy and Content Knowledge (TPACK) describes these complex teacher features and it has been used as theoretical model for teacher’s competencies. In the presented study the framework was applied for analyses of pre-service chemistry teachers’ programmes at Sofia University. The results show that high proportion of the curriculum is aimed to content (chemistry) competencies and pedagogical content competencies. There are insufficient courses aimed at technological knowledge and its relations to pedagogy and chemistry. The research conclusions should be taken into consideration and respective changes should be introduced to the university programmes and to in-service chemistry teachers’ training.

1. Introduction

Being a chemistry teacher is a real challenge nowadays. Chemistry evolves very quickly and every teacher has to be informed of its major achievements. These could help motivate students to study this difficult school subject. Educational sciences also offer diverse new approaches to organizing and developing students’ activities. Using these innovations, teachers teach chemistry in more interesting ways and engage their students in learning. Information and communication technologies (ICT) break the routine and change practices in and out of the school. Good teachers use them to improve teaching and learning as well as for better communication with colleagues or parents and for their own professional development. These features make chemistry teachers’ training a complex and lengthy process. It does not end with graduation but also requires attitudes towards continuing education and training. Mishra & Koehler [1] have proposed the framework Technological pedagogical and content knowledge (TPCK or TPACK) that “attempts to capture some of the essential qualities of teacher knowledge required for technology integration in teaching, while addressing the complex, multifaceted, and situated nature of this knowledge” [1].

The purpose of this study is to analyse the pre-service chemistry teachers’ preparation at Sofia University in terms of the conceptual framework Technological pedagogical and content knowledge. The main research question is: Do the teachers’ programmes provide opportunities to develop complex skills and competencies in chemistry teachers in the digital age? Recommendations for some changes in teachers’ training are proposed based on the results.
2. The conceptual framework “Technological pedagogical and content knowledge”

The framework was proposed by Mishra & Koehler [1, 2] and it builds on Lee Shulman’s construct [3, 4] of pedagogical content knowledge (PCK) to include technology knowledge. In this model (figure 1), “there are three main components of teachers’ knowledge: content, pedagogy and technology. Equally important to the model are the interactions between these bodies of knowledge, represented as PCK (pedagogical content knowledge), TCK (technological content knowledge), TPK (technological pedagogical knowledge), and TPACK” [5]. Brief definitions of these seven components of the model, according to Mishra & Koehler [5], are presented in this part of the paper.

Content knowledge (CK) is teachers’ knowledge about the subject matter to be learned or taught. As Shulman [3] noted, “this knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge”. In the case of science and chemistry, this includes knowledge of scientific facts and theories, the scientific method, and evidence-based reasoning. The cost of not having a comprehensive base of content knowledge can be prohibitive and students can receive incorrect information and develop misconceptions about the content area. Pedagogical knowledge (PK) is teachers’ deep knowledge about the processes and practices or methods of teaching and learning. Mishra & Koehler [5] underline that “this generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment”. Pedagogical knowledge requires also an understanding of cognitive, social, and developmental theories of learning and how they apply to students in the classroom. Mishra & Koehler [5] mentioned that “technology knowledge (TK) is always in a state of flux – more so than the other two core knowledge domains in the TPACK framework”. The authors argue that TK goes beyond traditional notions of computer literacy and requires a deeper, more essential understanding and mastery of information technology for information processing, communication, and problem solving than does the traditional definition of computer literacy.

Pedagogical content knowledge (PCK) is consistent with and similar to Shulman’s idea of knowledge of pedagogy that is applicable to the teaching of specific content. Central to Shulman’s conceptualization of PCK is the notion of the transformation of the subject matter for teaching [3]. This transformation occurs as the teacher interprets the subject matter, finds multiple ways to represent it, and adapts and tailors the instructional materials to alternative conceptions and students’ prior knowledge. According to Mishra &
Koehler, technology content knowledge (TCK) is an understanding of the manner in which technology and content influence and constrain one another. “Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies”. Technological pedagogical knowledge (TPK) is an understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies. To build TPK, a deeper understanding of the constraints and affordances of technologies and the disciplinary contexts within which they function is needed.

TPACK is an emergent form of knowledge that goes beyond all three “core” components. Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones [5].

3. Analysis of pre-service chemistry teachers’ programmes

The Faculty of Chemistry and Pharmacy at Sofia University offers three chemistry teachers’ bachelor programmes and one master programme “Teacher of Chemistry”. The students in the bachelor programmes graduate as teachers of: chemistry; chemistry and physics; chemistry and informatics. The master programme provides deeper knowledge on chemistry as school subject matter and teacher’s professional qualification including research skills on science education. The bachelor programmes are the focus of this study.

The analysis was accomplished in two directions: which are the courses (and their topics) that provide knowledge and competencies relevant to each component of the model TPCK; the number of credits (according to ECTS) for each component (table 1). There are some particularities of the programmes: (a) Informatics, programming and ICT technology are part of the content knowledge in the programme “Teacher of chemistry and informatics”; (b) The programme “Teacher of chemistry” is an optional module for all chemistry programmes at the Faculty of Chemistry and Pharmacy”.

<table>
<thead>
<tr>
<th>TPCK components</th>
<th>Bachelor Chemistry Teacher’s Programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teacher of Chemistry and informatics</td>
</tr>
<tr>
<td>Courses</td>
<td>ECTS</td>
</tr>
<tr>
<td>CK</td>
<td></td>
</tr>
<tr>
<td>Chemistry – general, inorganic, organic, analytical, physical, theoretical etc. Informatics – programming; data bases, computer systems etc.</td>
<td>115</td>
</tr>
<tr>
<td>TK</td>
<td></td>
</tr>
<tr>
<td>Programming; data bases, computer systems etc.</td>
<td>22</td>
</tr>
</tbody>
</table>

33
4. Discussion

The data (Table 1) indicate a very high proportion of content knowledge in chemistry teacher’s programmes. Courses aimed at Pedagogical content knowledge are adequately represented. There are one or two courses in each programme in the fields PK, TP and TPCK, which are a minor part of the teacher’s training. Pre-service teachers’ pedagogical competencies could improve by including classroom management courses.

There is a lack of courses aimed at TPK and TCK. The pre-service teachers’ preparation is insufficient in respect to the information and communication technologies and their application in science and educational practices. At the same time ICT provide more and more opportunities for teaching and learning. Future teachers will work at schools for at least 30 years. Therefore, teachers’ programmes should include elements ensuring ICT-competencies and building positive attitude for professional development in the technology field. For example, courses on ICT in education or computer applications for chemistry simulations on macro and micro (submicro) levels should be efficient.

5. Conclusions

The model Technology pedagogical content knowledge is a theoretical framework, designed on researches and analysis of teachers’ professional development and faculty development in higher education. Its application revealed positive aspects as well as certain omissions in the curriculum of the pre-service chemistry teachers’ programmes at Sofia University.

Reasonable changes should be accomplished in the programmes’ structure, based on the presented analysis results. They could be very useful in the design of future chemistry teacher’s programmes and for in-service teacher training.

References


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Training the Trainer: Pedagogical Needs Analysis of Five European Countries

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Boğaziçi University / Turkey

Özlem Ünlühisarcıklı
Boğaziçi University / Turkey

BOND, a European project with representatives from Austria, Hungary, Ireland, Portugal, Spain and Turkey, aims to transfer the Portuguese Pedagogical Training for Trainers Methodology (PTTM) to Vocational Education and Training (VET) teachers and trainers. The PTTM involves innovative practices that enable them to better reach adult learners and to improve their learning outcomes. By the selection, adaptation and translation of PTTM materials to the needs of the partner national target groups and then by the creation of the BOND toolboxes according to each countries’ specific requirements, each project partner will enhance their ability to support improvements in quality and innovation in their own organizations’ practices and in their national VET systems and facilitate the development of innovative practices in the VET field.

The PTTM is also a tool for preparing VET teachers and trainers to be aware of different competencies they require and for increasing their understanding of the importance of promoting the European Framework of Eight Key Competences for lifelong learning attitudes among adult learners. The project began with the undertaking of a quantitative training needs analysis survey of VET teachers and trainers in each of the participant partner countries. The intent was to identify those competencies in which participants in adult VET identify medium to high training needs with a view to incorporating these specific requirements into the BOND toolkit. 155 responses were received. Through the analyses top ten competencies for each country along with recommendations for competencies to emphasize in national deliveries of the PTTM are provided.

1. Introduction

It is widely acknowledged that the quality of Human Capital is crucial for Europe’s success. The Europe 2020 Strategy stresses the importance of education and training in improving the quality of human capital in order to promote smart, sustainable and inclusive growth. In this augmentation of the economic and social value of each citizen’s skill set, the role of teachers and trainers in the field of adult Vocational Education and Training (VET) is unquestioned. BOND, a European project with representatives from Austria, Hungary, Ireland, Portugal, Spain and Turkey, aims to support VET teachers and trainers through the dissemination of innovative practices that enable them to better reach adult learners and to improve their learning outcomes.

The BOND project aims to transfer the Portuguese Pedagogical Training for Trainers Methodology (PTTM) to VET teachers and trainers and other VET providers who wish to enhance their pedagogical and andragogical skills and competences. By the selection, adaptation and translation of PTTM materials to the needs of the partner national target groups and then by the creation of the BOND toolboxes according to each countries’ specific requirements, each project partner will enhance their ability to support improvements in quality and innovation in their own organisation’s practices and in their national VET systems and facilitate the development of innovative practices in the VET field.
2. Approach

The project began with the undertaking of a quantitative training needs analysis survey in each of the participant partner countries that had not already been exposed to the PTTM, namely Austria, Hungary, Ireland, Spain and Turkey. The intent was to identify those competencies in which participants in adult VET identify medium to high training needs with a view to incorporating these specific requirements into the BOND toolkit. Draft questionnaires were prepared, discussed and reviewed during project meetings of the consortium, the content agreed and a final version produced (Appendix A). The questionnaire was circulated amongst VET teachers and trainers in each partner jurisdiction. The first section of the questionnaires gathered general demographic information; the second, using four point Likert scales, gathered information relating to the importance of specific competencies to the VET teachers and trainers in their daily practice and their self-assessed training needs in these competencies.

3. Analysis of Survey Results

In this report only the results for the Turkish survey are reported.

Competencies

**Dimension 1 – Pedagogical**

About 90 percent of Turkish respondents rate the selected pedagogical competencies as being either very important or essential to their teaching and training. The most highly rated competence was that of “Identifying the advantages and disadvantages of the application of different training methods and pedagogical techniques in differentiated contexts”. Lowest scores were reserved for the competence of “Distinguishing different evaluation levels of the training results”, and for the competence of “Understanding the psychosocial phenomena, such as leadership, in training groups”. This however is reversed when the training need is examined, with 92 per cent of respondents rating their training need as medium to high for the competence of “Distinguishing different evaluation levels of the training results”, perhaps reflecting the fact that despite they may not have the need for this competence in their daily practice they still feel a need to develop their competency in this area.

<table>
<thead>
<tr>
<th>Competency</th>
<th>Importance to my teaching/training</th>
<th>My Training Need</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 % 2 % 3 % 4 %</td>
<td>1 % 2 % 3 % 4 %</td>
</tr>
<tr>
<td>Identifying the skills and competencies required to become a trainer</td>
<td>0 0 36 64</td>
<td>8 4 52 36</td>
</tr>
<tr>
<td>Identifying the concepts, theories and supporting models of the learning process</td>
<td>8 4 52 36</td>
<td>0 24 48 28</td>
</tr>
<tr>
<td>Identifying the most relevant factors, pedagogical aspects and conditions that facilitate the training/learning process</td>
<td>0 4 40 56</td>
<td>4 20 48 28</td>
</tr>
<tr>
<td>Understanding the psychosocial phenomena, such as leadership, in training groups</td>
<td>0 20 32 48</td>
<td>0 16 52 32</td>
</tr>
<tr>
<td>Understanding the dynamic of individual learning inside the working group</td>
<td>0 4 28 68</td>
<td>0 20 44 36</td>
</tr>
<tr>
<td>Describing the advantages and the importance of creativity on the pedagogical process</td>
<td>0 16 32 52</td>
<td>4 24 48 24</td>
</tr>
<tr>
<td>Identifying the advantages and disadvantages of the application of different training methods and pedagogical techniques in differentiated contexts</td>
<td>0 0 40 60</td>
<td>0 12 60 28</td>
</tr>
<tr>
<td>Identifying the features and advantages of e-learning and collaborative and learning platforms</td>
<td>0 12 36 52</td>
<td>0 12 44 44</td>
</tr>
<tr>
<td>Distinguishing different evaluation levels of the training results</td>
<td>0 20 36 44</td>
<td>4 4 56 36</td>
</tr>
</tbody>
</table>
**Dimension 2 – Organisational**

The organisational competencies are also considered as important by Turkish respondents with around 80 percent of them rating them as being very important or essential to their teaching and training. Of particular importance are the competences of “Planning training/learning moments”, and “Selecting, producing and applying of the pedagogical and didactic resources with multimedia support to fit pedagogical strategy adopted”. As with the pedagogical competencies, the importance ranking of a competence does not equate with the respondents self-assessment of training need. The highest felt training need is for the competence of “Applying a systemic analysis method to the training results” with 80 percent of Turkish respondents rating their training need as medium to high. The lowest training need is for the competence of “Being aware of VET legislation (national and European)” with 60 percent of Turkish respondents rating their training need as medium to high.

<table>
<thead>
<tr>
<th>Importance to my teaching/training</th>
<th>My Training Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 % 2 % 3 % 4 %</td>
<td>1 % 2 % 3 % 4 %</td>
</tr>
<tr>
<td>Being aware of VET legislation (national and European)</td>
<td>8 8 44 40 16 24 20 40</td>
</tr>
<tr>
<td>Being aware of ECVET (European Credit system for VET), the new European tool and methodological framework to facilitate the accumulation and transfer of credits for learning outcomes.</td>
<td>12 20 36 32 12 20 16 52</td>
</tr>
<tr>
<td>Characterising training systems based on the objectives, the target audience, the technologies and resources used and methodology of training required.</td>
<td>0 12 52 36 8 32 32 28</td>
</tr>
<tr>
<td>Planning training/learning moments</td>
<td>0 4 36 60 0 28 24 40</td>
</tr>
<tr>
<td>Applying a systemic analysis method to the training results</td>
<td>0 16 40 44 4 16 44 36</td>
</tr>
<tr>
<td>Selecting, producing and applying of the pedagogical and didactic resources with multimedia support to fit pedagogical strategy adopted</td>
<td>0 4 36 60 4 28 36 32</td>
</tr>
</tbody>
</table>

**Dimension 3 – Practice**

Of the Practice competencies 96 percent of Turkish respondents rate “producing, adapting and using multimedia presentations”, and “adapting the pedagogical approach and strategies to differentiated target groups” as being the most important competencies. The other competencies are also rated not less than 88 percent, so this dimension is composed of important competencies for the Turkish respondents. The learning need however is lower. Highest ranked in the training need, with 76 percent, is one of the two highest ranked competencies important in teaching and training, namely: “adapting the pedagogical approach and strategies to differentiated target groups”. The lowest rated competency, with 48 percent is “developing and applying evaluation tools based on pre-defined objectives, in order to check and control the learning results, training effectiveness and efficacy”.

<table>
<thead>
<tr>
<th>Importance to my teaching/training</th>
<th>My Training Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 % 2 % 3 % 4 %</td>
<td>1 % 2 % 3 % 4 %</td>
</tr>
<tr>
<td>Adapting the pedagogical approach and strategies to differentiated target groups</td>
<td>0 4 44 52 0 24 32 44</td>
</tr>
<tr>
<td>Producing, adapting and using multimedia presentations</td>
<td>0 4 32 64 16 28 24 32</td>
</tr>
<tr>
<td>Identifying and applying mechanisms/software of online communication</td>
<td>0 12 32 56 8 28 32 32</td>
</tr>
</tbody>
</table>
Developing and applying evaluation tools based on pre-defined objectives, in order to check and control the learning results, training effectiveness and efficacy

Comparing pedagogical skills acquired from the training with the performance level showed at the start of the training process.

Dimension 4 – Deontology and Ethics

Competencies in the deontology and ethics dimension are rated around 80 percent by Turkish respondents. Highest rated amongst these competencies is “developing a critical, creative and enterprising attitude” with 96 percent of respondents rating it as very important or essential. The second highest rated is the competency for “recognising the mediation role inside the working group” with 84 percent of respondents rating it as very important or essential. Lowest ranked with 74 percent of respondents rating it as very important or essential is the competency of “recognising the importance of e-trainer/e-mediator in the e-training process”. In terms of training needs again “developing a critical, creative and enterprising attitude”, is the highest dimension with 80 percent of respondents rating it as very important or essential.

<table>
<thead>
<tr>
<th>Dimension 4 – Deontology and Ethics</th>
<th>Importance to my teaching/training</th>
<th>My Training Need</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 %</td>
<td>2 %</td>
</tr>
<tr>
<td>Developing critical, creative and enterprising attitude</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Practicing skills of analysis and self-analysis on observed behaviours</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Recognising the mediation role inside the working group</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Recognising the importance of e-trainer/e-mediator in the e-training process</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Identifying the causes of subjectivity in assessment</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Implementing regulatory measures to improve the training process</td>
<td>0</td>
<td>16</td>
</tr>
</tbody>
</table>

4. National Recommendations

In this questionnaire, Turkish respondents have clearly identified the following competency areas as being those in which they have a medium to high training need. In terms of national adaptation and toolboxes development, arising from the needs analysis, it is considered that the following competences require attention in the Turkish context:

(1) Distinguishing different evaluation levels of the training results. (2) Identifying the features and advantages of e-learning and collaborative and learning platforms. (3) Applying a systemic analysis method to the training results. (4) Being aware of ECVET (European Credit system for VET), the new European tool and methodological framework to facilitate the accumulation and transfer of credits for learning outcomes. (5) Adapting the pedagogical approach and strategies to differentiated target groups. (6) Comparing pedagogical skills acquired from the training with the performance level showed at the start of the training process. (7) Developing a critical, creative and enterprising attitude. (8) Implementing regulatory measures to improve the training process.

References

**Short professional profile of the speaker:**

Fatih Çağlayan Mercan – Assistant Professor, Bogazici University

Dr. Fatih Çağlayan Mercan completed his undergraduate studies in Marmara University Teaching Physics Department in 1994. He was awarded National Ministry of Education’s scholarship for graduate studies and received his masters’ degree in 2001 and doctorate degree in 2007 specializing in Science Education at The Ohio State University. Dr. Mercan has been teaching at the Department of Secondary School Science and Mathematics Education of Bogazici University since 2007. Dr. Mercan teaches teaching methods for science and mathematics, research methods, and curriculum courses. He also teaches training the trainer programs at the university lifelong learning center.

Özlem Ünlühisarcıklı – Associate Professor, Bogazici University

After graduating from Boğaziçi University, Department of Foreign Language Education in 1990, Dr. Ünlühisarcıklı completed her M.A. at Boğaziçi University, Department of Educational Sciences during which time she worked as a research assistant in the same department. In 1995 she was awarded the Higher Education Council PhD scholarship and studied in Manchester University to pursue her academic training on adult education. Dr. Ünlühisarcıklı has been teaching at the Department of Educational Sciences since 1999. She has her degrees in lifelong learning. From 2001 on she instructs courses in this area. She has previous EU and international project experience. She has good experience in lifelong learning issues and she works as an advisor with different institutions, and has participated in various VET projects. She has experience in program development and implementation.
Training teachers in competence based education – the TRANSIt case

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The key competence acquisition by every young person is one of the long term objectives of the updated strategic framework for European cooperation. Most of the EU Member States are formulating and at least beginning to implement policies that move their school systems from being predominantly input led and subject-oriented towards curricula which include competences, cross-curricular activities, active and individual learning, as well as a focus on learning outcomes. Yet, these developments do not necessarily result in significant, widespread changes in practice – that is, in how schools actually organise and provide learning experiences for pupils. The difficulty is in all cases translating these policies into practice. TRANSIt is a European project that aims to contribute to the enhancement of transversal key competences of students through building teachers capacity for competence oriented education. This paper presents the outcomes from the needs analysis survey on key competence acquisition in Greece, as well as the design and localisation of the Training Framework and environment based on the collected responses and the specifications set from the Greek Curriculum, the community support mechanisms that have been developed, as well as the impact of these mechanisms based on indicators and survey results from users.

Keywords: Competences, transversal competences, project-based learning, interdisciplinary, professional development, communities of practice, authentic assessment, ePortfolios

1. Introduction

Key competence acquisition (KCA) is one of the long term objectives of the updated strategic framework for European cooperation (Official Journal of the European Union, 2009). The concept of key competence originated with the adoption of the Lisbon Strategy in 2000 and it resulted in the European Reference Framework (European Commission, 2006). Key competences in the EU framework are those that ‘all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment’. The Framework identifies and defines eight (8) key competences:

1. Communication in the mother tongue;
2. Communication in foreign languages;
3. Mathematical competence and basic competences in science and technology;
4. Digital competence;
5. Learning to learn;
6. Social and civic competences;
7. Sense of initiative and entrepreneurship;
8. Cultural awareness and expression;

The last five (5) competences are considered transversal. Most of the EU Member States are beginning to implement policies that move their school systems from being predominantly subject-oriented towards curricula which include competences, active and individual learning, as well as a focus on learning out-
comes. One such example is Greece, where in the school year 2011-2012, pilot curricula for competence driven education have been introduced. In Austria however, the promotion of holistic teaching methods has been supported at policy level for several years. In other countries (e.g. France, Netherlands) innovative policies are already embedded in national strategy documents and in some cases these have already led to major structural changes, such as the introduction of new qualifications frameworks or the reform of the curriculum around the Key Competences (European Commission, 2009a). In general, there are a variety of different models of competences in European countries (European Commission/EACEA/Eurydice, 2012).

Yet, these developments do not necessarily result in significant, widespread changes in practice – that is, in how schools actually organise and provide learning experiences for pupils. The difficulty is in all cases translating these policies into practice. One of the core problems for the effective implementation of the above policies is the lack of initial education and training, as well as systematic support of teachers. One more obstacle regarding KCA is the lack of effective assessment practices. Assessment of competence is one of the vehicles that can be used to support teachers in making this paradigm shift (Black & William, 1998). This places new demands on the competences of teachers and trainers and therefore on the structure and content of initial and continuing teacher education (European Commission, 2009b). “TRANSIt - TRANSVersal key competences for lifelong learning: Training teachers in competence based education” approach aims to support teachers at bridging the gap between policy and practice on a European scale.

This paper presents the outcomes from the needs analysis survey on key competence acquisition in Greece, as well as the design and localisation of the Training Framework and environment based on the collected responses and the specifications set from the Greek Curriculum, the community support mechanisms that have been developed, as well as the impact of these mechanisms based on indicators and survey results from users.

2. **TRANSIt project**

The aim of “TRANSIt” project is to have a positive impact on the development of students’ competencies by building teachers capacity, in line with the EU objectives; thus prioritising the improvement and quality of teacher education to have a direct effect upon levels of students KCA (Official Journal of the European Union, 2007). To achieve this, a pilot teachers training methodology is developed on the didactics and e-assessment of key transversal competences. The methods of the project are founded on a holistic view of students learning, going beyond subject boundaries and finding application in a wide spectrum of curriculum subjects. The TRANSIt approach contributes to the development of creativity, intercultural and multilingual competences, social development, and “learning to learn” competences. TRANSIt aims to contribute towards the improvement of the quality of competence education by improving teachers’ awareness and professional skills regarding the didactics and e-assessment of the key competences with the use of ePortfolios, and supporting them to bring European and national policies into practice.

The overall approach taken towards delivery of the training is based on the methodological principles of participatory design with the user groups in the development of the training framework. To this end, stakeholders’ needs analysis was performed in order to identify the obstacles in the process of introducing new approaches in teaching practice and to identify enablers that will effectively support such interventions. The training programme includes cycles of school-centered activities aimed at getting teachers feedback about their experiences gained in the classroom during the implementation of the proposed activities.

3. **Current state of Competence-Based Learning in Greece**

In this section we focus on specific aspects about current policy and practice regarding Competence Based Learning (CBL) activities in Greece. CBL activities are defined here as educational activities aimed to students’ KCA. First, we give an overview of the features from the educational system that may have an impact in current practice of CBL. Then, we explain the results of the needs analysis.
3.1. Policy
The method by which competences have been introduced in the education system varies among countries. Some have introduced these approaches through adaptations of the curriculum, whilst others have done it through legislative change (Gordon, et al. 2009). Greece is such an example, where in the school year 2011-2012, pilot curricula for competence driven education based on the National Life Long Learning Strategies for the ‘New School’ of the Greek Ministry of Education, Life Long Learning and Religious Affairs have been introduced (http://dschool.edu.gr/).

3.2 Needs analysis of Competence-Based Learning from teachers in Greece
This section aims to present the feedback provided by the target groups of the project from Greece (teachers (in-service, pre-service), teacher trainers, educational policy makers) in the online survey. LimeSurvey was used for the online Greek questionnaire aimed at identifying the profiles of the possible participants in TRANSIt training activities, the current implementation of competence-based didactics and assessment, as well as participants training needs. The link for the survey was made available through the etwinning mailing list by the National Contact Service, CTI Diophantus. In the survey 648 responses were collected. The survey is analytically presented in Riviou & Sotiriou (2013).

3.3 User profile
From the participants, 196 (30%) were men and 452 (70%) women with the majority in the age range of 41 to 51 years old. Respondents are mostly teachers in secondary education (74,80%) and primary education (48,60%). The next group of participants with highest representation are School leaders (11%), Teachers’ trainers (10,40%), Pre-service Teachers with percentage of 3,60%, Curriculum developers and Educational Policy Makers (1%), each, whereas other roles were 3,40%. The majority of respondents have a more than 15 years’ experience in their profession. Regarding usage of ICT, the highest percentage defines themselves to be “Enthusiastic on the use of ICT” (56,64%), while those claiming to have taken part in continuing professional development (CPD) activities on the theme of competence acquisition was (55,25%).

3.4 Current implementation of didactics and assessment of key competences
Throughout the survey, participants reflected on their own competence on teaching and assessing transversal key competences. Participants feel most confident about teaching digital competence (49%). Additionally, a great percentage of participants mention the collaboration with colleagues for the design and implementation of cross-curricular projects, as crucial factor. Regarding the assessment tools/methods that teachers mostly use ePortfolios and Rubrics have the lowest levels of use with percentages of 57% and 52% respectively. In general, teachers report a lack of knowledge about competence-based assessment techniques. This means that teachers mostly perform concept-based evaluation.

3.5 Limitations of school practice/Curriculum opportunities for applying CBL
Participants spot several constraints to the systematic implementation of transversal CBL activities. They feel their working schedule doesn’t allow for the educational innovation they would like, the most frequent answer being time constraints. The low availability of resources and a very limited flexibility to use them has also been mentioned among the biggest barriers encountered. Given the constraints, participants identified enablers to the implementation of CBL activities. As participants indicated CBL is usually implemented in the classroom and not in extra-curricular activities. A percentage of 23,55% indicates that CBL is usually implemented by running projects with their students.

3.6 Training needs
Data collected on training needs is consistent with the current implementation of CBL. The most important item is “Didactics and teaching methods” and most particularly regarding the themes applied throughout competences: critical thinking, creativity, initiative, problem solving, risk assessment, decision taking, and constructive management of feelings. The second most required training need is competence-based assessment. Participants are particularly interested in learning about specific tools to assess competences. Regarding the activities/methods to be incorporated in training workshops, participants expressed their high interest primarily for Demonstrations of tools and instruments (60,80%), Practical assignments (56,20%) and then Examples of good practices (53,90%), demonstrating the need to undertake hands-on training.
4. **TRANSIt Training Framework**

The TRANSIt Teacher Competency Framework defines the criteria from which it will be possible for a teacher to determine how competent they are in didactics and e-assessment of transversal key competences (using rubrics). A competence framework is a model that broadly defines the blueprint for ‘excellent’ performance within an organisation or sector. The frameworks that influenced its design were the UNESCO ICT Competency Framework for Teachers (United Nations 2011) and the Western Australia Teacher Competency Framework (Western Australia, Department of Education, 2009). The TRANSIt Competency Framework comprises of four dimensions and three stages. The four dimensions are:

1. Facilitating Student Learning
2. Assessing and Reporting Student Learning Outcomes
3. Engaging in Continuing Professional Development
4. Establishing Partnerships and Collaborations.

Each dimension describes the generic characteristics of teachers’ work that are central to their professional effectiveness. Within these dimensions are indicators of effective practice, which are competency-related professional actions.

Competency standards are concerned with application of professional knowledge and skills within the workplace and are underpinned by teachers’ professional values. Each competency standard is a statement of the level of competency a teacher exhibits for that dimension. In the TRANSIt Training Framework there is a qualitative scale for every competence. Professional excellence in the context of competence-based learning involves teachers engaging in all dimensions.

Each stage identifies standards in the use of skills, knowledge and attitudes/values according to the dimension being used by the teacher. These elements are interrelated in the way teachers operate in their day-to-day teaching in classrooms. The framework is designed with each stage requiring more complex standards of attainment. The work and activities of teachers at any given time helps them identify the competence stage they are at. This framework views teachers’ work as a continuum of practice. Teachers at any stage in their career may operate in different stages or parts of all stages. As teachers identify areas for improvement in particular competencies, it is recommended that they seek CPD to address a specific competency or part of a competency, visiting the respective areas of the TRANSIt training course.

Moreover, based on the needs analysis survey the Training Framework has been designed in a modular format, so that it could be localised. Teachers taking the course or course modules were handled as learners participating in authentic learning activities; also creating and using e-Portfolios as part of their learning process. This is supported by the tools and features of the TRANSIt learning environment. A combination of open source tools has been chosen; Moodle for delivering the training resources and Mahara as eportfolio tool (Figure 1).

![Figure 1. TRANSIt training environment (http://transit.cti.gr/moodle/) – Link to Mahara ePortfolio tool](http://transit.cti.gr/moodle/)

Below follows the suggested CBL assessment procedure in alignment with the National Curriculum.
4.2. Authentic assessment
In order for assessment to be authentic, the proposed approach is the use of eportfolio combined with rubrics, in two levels, in teachers' training/competence development, as well as for the classroom practice (e.g. as students' projects in Upper Secondary School according with National Curriculum). Eportfolios is a means where learners might collect the evidence of their choice in order to demonstrate the achievement of the educational goals and desired competences. Rubrics are suggested for peer and self-assessment. Teachers are trained and supported to use the Mahara eportfolio tool with their students working on projects, e.g. upper secondary school as set by the national curriculum. Mahara may be used by students in order to keep their journals, upload their group meetings, reports, presenting the topic, goals, procedures for collecting and processing data, conclusions and reflection of the group about collaboration between members, as well as any artifacts produced during their implementation of projects towards their final public presentation (film/documentaries, poster, hand-crafts etc.) Rubrics are suggested to be used by teachers for evaluating the teams, as well as students' eportfolios and activities, according with the guidelines set by Matsagouras (2011). The approach towards supporting teachers in designing learning scenarios is to provide exemplar templates or descriptions which can be shared, re-used and adapted to different contexts. Below follows the description of the project-based learning template that is suggested to be used, as well as the assessment procedure.

4.3 The project-based learning template
In the context of COSMOS and ODS projects, with an aim to support teachers document and exchange their practices, templates have been created for different teaching approaches and pedagogical models, among them the “project-based learning” (Sotiriou, et. al, 2011; Hatzilakos, et. al, 2013). The template has been developed from an analysis of the state-of-the-art, and more specifically the Learning Activity Reference Model (LARM), so as to ensure maximum consistency with regard to the constituent elements and the metadata needed for indexation. The specific template is slightly adapted, and is suggested to be used by teachers in the context of TRANSIt project for CBL delivery (Riviou & Kouroupetrogloou, 2014).

In the following sections the specific activities will be described that have been implemented in order to support the community in the thematic area of CBL. The first step has been the instantiation of such a community on ODS portal. The activities organised to keep the community connected, populate it with resources and towards building trust, such as contest promoting the best user generated content (by teachers) and offering summer schools as rewards, training workshops, will be described.

5. Supporting the community of practice around competence development
The key to effective professional development is finding a way to organise qualified teachers, so they can collaborate with their colleagues. Collaboration and exchange of practices needs to be encouraged through training. To this end, a dedicated community of practice has been created on ODS portal, as well as multilingual sub-communities (EL, NL, ES, FR). Moreover, with an aim to support the engagement of teachers a series of online, as well as offline events have been delivered. In the case of Greece at the time of writing apart from the provision of the online pilot course, the following have been designed and delivered. Participants in every case were given instructions on the dedicated TRANSIt Greek Community on ODS portal1.

**Face to face training events**
The summer schools 2013 and 2014 (July 2013 & 2014 respectively) focused on practices fostering competences. Best practices on CBL were presented and ICT tools were used. The participants developed their own learning scenarios using the Octopus and ODS learning design tools2 and uploaded them to the summer school community. Moreover, workshops have been implemented in three cities: Athens, Patras & Heraklion.

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Online training events
Three webinars have been held entitled: “Evaluation and ICT integration in project based learning”3, “This year I will be implementing projects with my students – what do I need to know?”4 and “Authentic evaluation: Use of ePortfolio tools in projects”5. More than 100 people as an average have registered to attend them and the number of views on YouTube is impressive, one of the webinar recordings has currently more than 1,400 views. This fact shows the value of such activities as well as the great flexibility that online CPD offers.

Contest
As the NESTA Challenge Guide6 states “Prizes are thriving in the context of opportunities for connection and collaboration offered by the internet and social media. To this end, a Contest of competence based learning scenario design has been organised among the members of the TRANSIt Greek Community. The contest winner has been granted the attendance of the five-days TRANSIt Summer Course 2014.

6. Evaluation Results from Users
Organisational aspects such as the venue, the programme and the materials of the training activities/events, as well as the actual training content have been assessed. The main areas covered were awareness, didactics, and assessment of Transversal Key Competences, as well as the impact of the pilot training activities.

7.1 Assessment tools
The tools used were a user satisfaction questionnaire and an interview guide. The questionnaire was filled in by 142 participants and 13 interviews have been conducted.

7.2 User profile
Regarding participants’ profession, 59% of participants were secondary education teachers, 32% primary education teachers, 5% head teachers, 1% teacher trainers and 1% other (educational psychologists, etc) with 37% having more than 15 years of experience Participants graded their satisfaction with organisational aspects of the webinar, as well as the face to face workshops on a five-point Likert scale from 1 (very bad) to 5 (excellent). Overall, the mean value of overall assessment of all implemented events completed by 142 teachers is 4.33 in the scale of 5 that is a rather satisfactory result.

7.3 Data from interviews
Interviews conducted allowed gaining deeper knowledge on specific aspects of CBL, as well as a way to record the impact of the training programme.

Awareness of Transversal Key Competences
All interviewees state that as a result of the events they have increased their awareness on transversal key competences, the skills/horizontal themes that exist in all (critical thinking, communication, creativity), as well as the ways that Transversal Key Competences affect their current practice.

Professional skills and knowledge on didactics of Transversal Key Competences
Generally, participants have gained useful knowledge and skills on didactics of transversal key competences. They can see how educational practices based on project-based learning can help them to design and implement learning scenarios that foster students’ competences.

Professional skills and knowledge on e-assessment of Transversal Key Competences
Two teachers believe that e-assessment of competences is a difficult task and ICT tools are a means for focusing and aiming at competence acquisition for 21st century citizens. Six teachers mention the benefits of keeping electronic records from their students’ achievement in a form of e-portfolio. One teacher mentions that strategies need to be set for assessing the themes crossing competences: creativity, critical thinking, initiative etc.

3 https://www.youtube.com/watch?v=cQzesbcq4f8
4 https://www.youtube.com/watch?v=LGdAIBXnxM
5 https://www.youtube.com/watch?v=UhfJAyOx7Xc
Impact
Participants value the knowledge they gained on European and local policies regarding student acquisition of Transversal Key Competences. They are rather satisfied about the best practices/scenarios demonstrated, as well as about the skills they developed regarding planning, structuring and sequencing cross-curricular learning activities with ICT tools. Especially, the interviewees highlight the value of learning how to share resources and practices and collaborate with other teachers. All participants (100%) would recommend the events to colleagues, a fact that shows the overall satisfaction from them. Regarding the exploitation of the application of what has been learnt 65% claim that they will implement it in their classrooms the upcoming school year.

7. Conclusion and recommendations

In general, the EU is prioritising the improvement of the quality of teacher education so as to have a direct effect upon levels of students’ acquisition of competences. Therefore, the professional development of teachers and their training is a key requirement for the way forward (European Commission, 2010).

Our needs analysis confirms that, given the limitations imposed by the official curriculum in Greece, teachers are generally motivated to make a paradigm shift towards competence-based teaching. This is indicated by the high percentage (95%) of participants in the needs analysis study that have provided their contact details in order to be informed about the project’s training and piloting activities.

The profile of the participants demonstrates that there is a strong interest especially by secondary education teachers to get trained and exchange practices within peer networks and communities of practice. This is aligned with the literature findings that the situation is even worse for teachers of secondary education since their training has not prepared them for the most part for holistic methods and cross-curricular teaching, although primary teachers may have more expertise in multidisciplinary CBL approaches (European Commission, 2009a).

The preference of teachers and head teachers to learn primarily from demonstration of tools and instruments, practical assignments and examples of good practices, demonstrates the need of stakeholders to undertake hands-on training, and that teachers need support in their everyday practice). This can be explained since they probably face difficulties in translating the policy into teaching practice, especially when they don’t have the proper underpinnings. Participants also express the need to get trained regarding competence based assessment. TRANSIt training framework and environment designed based on participants’ needs and requirements has been presented. TRANSIt environment has been designed with use of open source tools (Moodle, Mahara), as well as the Open Badge Infrastructure, as a mechanism for accrediting teachers in their community. TRANSIt training content includes specific examples/good practices and tries to address the training needs with an emphasis on assessment methods and tools, also by taking into consideration European reports (Redecker, 2013), as well as the national context requirements set by the Greek Curriculum.

The key to effective professional development is finding a way to organise qualified teachers, so they can collaborate with their colleagues. Collaboration and exchange of practices needs to be encouraged through training, let alone since participants refer to the benefits of collaboration with colleagues. TRANSIt has created a respective community of practice, where teachers are able to exchange and co-create their cross-curricular educational scenarios on the ODS portal: “Training teachers in competence based education: TRANSIt”. All interested stakeholders are kindly invited to register and have access to the cross-curricular scenarios designed by peers.

Acknowledgement
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BaCuLit and ISIT: Two European Comenius Projects developing and implementing a “Basic Curriculum for Teachers’ In-Service Training in Content Area Literacy” in Secondary Schools and Teacher Training Institutions

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BaCuLit is an international in-service teacher training programme which aims at providing secondary teachers of all school subjects the necessary knowledge and skills to support their students in “reading and writing to learn” (www.baculit.eu). BaCuLit was developed in 2011/2012 with experts of 7 European countries (Germany, Hungary, Netherlands, Norway, Portugal, Romania and Sweden). The curriculum consists of 6 core modules comprising about 40 hs of training. These modules contain the BaCuLit principles of lesson planning, engagement, interaction and metacognition as well as basic knowledge about text structure and text diversity, academic vocabulary instruction, reading strategies and formative assessment.

The BaCuLit training concept builds upon international research on effective in-service training and engages participants in building new knowledge through practical exercises in their everyday classrooms between the course units, documented and reflected in a portfolio. The BaCuLit course is available in English and 6 European languages and can be disseminated in other countries as well.

In the currently funded Comenius project ISIT (Implementation Strategies for Innovations in Teachers´ Professional Development, 2013–2014) (www.isit-project.eu) the implementation opportunities of regular BaCuLit courses in teacher training institutions in three core countries (Germany, Hungary, Romania) and five associated countries (Belgium, Cyprus, Finland, Greece, Portugal) are being explored and analyzed. More than 40 teacher trainers from the 3 core partner countries have been trained and certified as BaCuLit trainers by means of a Blended Learning Course and an International Summer School. BaCuLit will soon be available in an E-Learning version in 4 languages: English, German, Hungarian and Romanian.

The BaCuLit Project

The BaCuLit project is an answer to the reading difficulties of adolescents [1] which have been revealed by the PISA studies and which the educational policy of the EU Commission aims to reduce. One reason for these deficits of adolescents is seen in the lack of a systematical reading instruction in mother tongue as well as content area education in secondary schools. However, international reading research found that understanding content area texts (or disciplinary texts) should be taught in all subjects and all grades systematically (CAL: content area literacy). The term “content area literacy” refers to teachers’ competence to deal with reading / writing and learning instruction not only on the elementary level in the language arts classes, but in all subjects and all school levels. But in most European countries, content area teachers are not trained to fulfill this task. This is where the BaCuLit project intervenes.
BaCuLit defines the first overall European minimal standard as well as research-based principles of professional development (= PD) for in-service teacher training in content area literacy. The BaCuLit Project offers a PD course containing six modules which include a complete teaching material set of PPT slides, worksheets, a Teachers’ Workbook and a Trainer’s Handbook with work plans for every course unit and theoretical background information. These Modules contain ‘essential’ and ‘optional’ content and can be taught flexibly, according to national conditions and the needs of diverse schools, teaching staff or single teachers.

The first draft of the “Basic Curriculum in Content Area Literacy” has been implemented and formatively evaluated in six European countries (Germany, Hungary, Netherlands, Portugal, Romania and Sweden) in pilot courses with the target group; after analysing the evaluation results the BaCuLit consortium modified the concept and materials which are now available in its final version.

Module 1: General Principles of BaCuLit / BaCuLit Framework for Lesson Planning;
Module 2: Text Organization and Text Diversity;
Module 3: Teaching Academic Vocabulary;
Module 4: Teaching Cognitive and Metacognitive Reading Strategies;
Module 5: Formative Assessment for Content Literacy and Learning;
Module 6: Lesson Planning II: Teachers create their own Lesson Plans.

On average the modules’ content covers 6 hours course work, divided into 3 hours units, but single modules are longer (e.g. the basic module no. 1) or shorter (e.g. module 3). The BaCuLit framework for lesson planning, the conceptual foundations for the whole course and the Basic Module No. 1 (as example) are downloadable on the project’s website in English and the partners’ languages. The complete materials (PPTs, Teachers’ Workbook, Trainer’s Handbook) will only be available when attending a BaCuLit course [2].

The BaCuLit project addresses all decision makers in educational policy and in schools who are responsible for the training of secondary school teachers. However, the main target group are the content area teachers participating in the BaCuLit courses in order to improve their own instruction or to become future BaCuLit trainers (multiplier approach). Finally, the students will benefit from the increased expertise of their teachers as teachers will learn how to support their students by providing guided text comprehension. Furthermore, the project offers teacher training institutions and decision makers in educational policy a scientifically based and practically tested core curriculum for the education and training of teachers which allows reducing the striking deficits of adolescents in reading literacy.
The BaCuLit consortium consisted of ten partners from universities and teacher training institutions from all over Europe. They were consulted by two well-known American experts in the field of reading literacy. In the last phase, the BaCuLit consortium founded an International BaCuLit Association which is in charge of further developing the BaCuLit curriculum and defining and controlling quality standards of BaCuLit teachers and BaCuLit trainers via certification.

The ISIT Project

The ongoing ISIT project (funded from 12/2013 to 11/2014) addresses two of the crucial needs defined by the EU Education and Training Benchmarks for 2020 and by the Final Report of the High Level Group of Experts on Literacy [3]: the problem of low literacy skills in many European countries and the unsatisfying status of teachers' continuous professional development (CPD) in the EU.

European reports about the conditions of teachers’ in-service training [4] offer valuable data concerning teachers’ professional development (CPD) in European countries on a general level, which form a reliable frame for orientation, but they do not provide advice for the central question of this project: Which strategies for the implementation of innovations are suitable for the respective educational systems? As to this question we need more specific qualitative data which have to be gained in a process that closely links research to practice, similar to the principles of action research. Action research is conducted in natural (e.g. educational) settings „in an ongoing cycle of planning, acting, observing, and reflecting on change”. Central principles of action research are not to separate research from action (change, innovation) and likewise not to separate researchers from actors. “Action research is examining one’s own practices through collaborative inquiry, reflection, and dialogue.” [5]

The ISIT project thus pursues two goals: (1) training at least 30 teacher educators from 3 European countries (Germany, Hungary, Romania) in content area literacy (CAL) (specific goal) and (2) analyzing methods and identifying good examples of how to implement innovations into different national structures of CPD (general, comparative goal). The connection of both goals will be realized by accompanying the teacher educators while they integrate CAL courses (offers) into the existing CPD activities of their institutions. ISIT based on the assumption that experiences with implementing CAL are valid and helpful also for other kinds of innovation. Thus they can be used by all actors who want to implement new methods, materials or subject-related focuses into CPD.

The project follows a multiplier approach: by training teacher educators (narrow target group) it will reach out to secondary school teachers (second target group) which will have a positive impact on the long-term target group of students with low literacy skills (broadest target group).

A further objective is the dissemination of BaCuLit (or adapted CAL courses) in five other European countries. Although the project focusses on three countries, partners from 5 other countries participate in the International ISIT Summerschool (August 2014) and in the final project meeting in order to gain new and comparative insights and to give input and advice from the perspective of their countries. These “corresponding partners” are from Belgium, Cyprus, Finland, Greece, and Portugal.

ISIT builds upon the results of the Comenius project BaCuLit providing a comprehensive curriculum in CAL for CPD, including course materials and trainer handbooks. Baculit is to be understood as a model of an innovative training programme for teachers; but we are well aware of the fact, that trainers have to adopt it to current requirements, programmes and time frames. Thus we do not aim at implementing a fixed training programme but to train the trainers in flexibly adopting its standards and materials.

ISIT aims at implementing this curriculum into the CPD structure of Germany, Hungary and Romania, where a total of 45 teacher educators from different training institutions has been made familiar during the first project phase with the BaCuLit curriculum by means of an E-Learning course (on the platform ITSLearning) and a one-week International Summerschool, where all participants from 8 countries personally met and worked together in August 2014. After being trained and certified as BaCuLit trainers the teacher educators currently explore the opportunities of regular sustainable implementation of BaCuLit courses in their training...
institutions and document the steps taken during this process in an implementation logbook. The BaCuLit trainers will analyze together with scientists the steps and obstacles in implementing CAL courses in their institutions. Thus, ISIT intends to explore the general opportunities and obstacles in implementing innovation into teachers CPD in these 3 countries.

Further information on BaCuLit is available on the project’s website:  
http://www.baculit.eu

Further information on ISIT is available on the project’s website:  
http://www.isit-project.eu

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[1] BaCuLit builds upon the results of another European (Socrates) project coordinated by Christine Garbe between 2006 and 2009: ADORE. The results of this project have been documented in: Garbe, Christine; Holle, Karl; Weinhold, Swantje (Eds.) (2010): Teaching Struggling Adolescent Readers in European Countries. Key Elements of Good Practice. Frankfurt/M. u.a.: Peter Lang.

Short professional profile of the speaker:

Christine Garbe studied German Literature, Social Sciences and Pedagogy and accomplished her qualification as grammar school teacher and her doctorate (PhD) in Berlin. From 1996 to 2010 she worked as Professor for German Literature at the University of Lueneburg, since 2010 she holds the chair for “Reading and Media Socialisation” at the University of Cologne. Garbe published numerous articles and books about gender and reading, reading socialisation, adolescent literacy, children and youth literature. Since 2006 she has coordinated major European projects about Struggling Adolescent Readers in Europe (ADORE), about Professional Development of Teachers in Content Area Literacy (BaCuLit, ISIT) and for building up a European Literacy Policy Network (ELINET).
Issues in competence-based curriculum. 
The case of Romania

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The paper attempts to present the curricular changes in Romania during the last 15 years. This time has been emblematic for the design and implementation of a competence-based approach. The current state of the arts is a particular highlight of the presentation and it includes the organization of the nowadays subject curricula. The concluding points try to offer a sum-up of the problematic road to curricular innovation in Romania.

1. Short chronology

A major change in the Romanian curriculum development took place in 1998 when the first student-centered policy documents were published and a new grade 1 to 5 objective-based curriculum started to be implemented. The curriculum for the following 6 to 8 grades was developed and implemented during the next couple of years [2]. Since 1998, the official Romanian curriculum includes:

- a curriculum framework which comprises the mandatory school subjects and their weekly time allocation, together with a number of weekly hours for the school-based curriculum (the subjects are grouped into curricular areas that reflect common concepts and methodology);
- subject curricula that give the learning offer for each mandatory school subject in the framework.

The year 2000 marks a more innovative perspective since the new competence-based curriculum for high-school had been published and started being implemented. The curricular changes tried to give an answer of adaptation on behalf of the school to the new demands of a different type of society and economy. In actual terms, the intention was to structure a learning offer that should be meaningful for the youth in the new millennium. This offer had to distance itself from an ideological past that had profoundly marked our education system both in terms of ideal as well as content selection and methodology.

The generative framework for the competences development consisted in a set of cognitive categories that were to be applied to the specific subject epistemological model and the age characteristics of the student [3]. The curriculum developers had to ask questions like: Why address this concept for this age range? Is this issue still relevant nowadays? How to develop progression from one grade to another?

The above mentioned innovations were promoted within the reform of education that was implemented through a joint project of the World Bank and the Romanian Government. The respective project was completed in 2002. During the following10 years, two new Laws of Education (in 2003 and 2011 respectively) and a lot of curricular revisions were adopted in Romania. Many of the latter derived from the difficult implementation of a student-based approach by teachers who were only trained to address a textbook-based approach delivered to a neutral student, with minor, if any, adaptation. Consequently some revisions of the curriculum were formal (such as the low secondary curriculum that was redesigned in the competence-based format of the high school with very little conceptual or methodological innovation in 2009). Others were more substantial like, for instance, the introduction, in the Law of Education in 2011, of the preparatory grade and a competence-based desired profile of the students.
2. A competence-based profile in the Romanian school

The European Recommendation [1] for key competences for lifelong learning was adopted at the level of the latest Romanian Law of Education in 2011. All the eight key competences in the European document are listed in the Law and constitute the core orientation for the current curricular development. The structure of the new curriculum (which started to be redesigned in 2012-2013 with grades 0 (preparatory) – 1 and 2 and is currently in development for grades 3 and 4) comprises the following components for each school subject:

- an introduction that explains the options of the curriculum developers in structuring the learning offer;
- general competences that give the outline for the progression of learning throughout a school cycle (they are developed in correlation with other general competences for various other subjects, mainly for those that belong to the same curricular area);
- specific competences that are derived from the general ones and are aimed at during a school year (their formulation is specific enough to allow the design of assessment tasks and flexible enough to permit a variety of individual and contextual learning tasks to be done by students of various rhythms of learning);
- examples of learning tasks that are associated with each specific competence so that teachers can have a range of options in the design of their particular approach;
- content units that include concepts and contexts as operational basis for the development of the competences and for the progress in understanding a school discipline;
- methodological suggestions that support teachers in organizing the facilitation of their students’ learning.

3. Key issues

The many changes the Romanian curriculum went through make the respective process quite problematic. Developers tried to adapt the curricular texts to various policies and governmental strategies but not always succeeded in their design. Practitioners never had enough time to reflect on and implement the changes. Initial teacher training failed to adopt a true reform that could sustain the curricular innovation. Routine-based practice and a survival tendency that always by-pass top-down ministerial regulation are also part of the complicated picture. Nevertheless we do have a competence-based curriculum.

After 15 years of designs and implementations we can highlight the following:

- the official curriculum declares its belonging to a competence-based paradigm and evolves around the eight key competences stipulated in the European Recommendation;
- declarations in the introduction are not always consistent with the main core of the subject curriculum but more often than once the developers do their best to define a flexible, student-centered learning offer;
- competence-based teaching is far more complicated than the official curriculum design since the routine and lack of quality teacher education tend to divert the innovative approach and good intentions.

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Short professional profile of the speaker:

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His interests include: education policies, in particular focused on students at risk of exclusion, education management and financing, teacher training, civil society involvement in education. He is involved in the current curriculum development in Romania.
In South Korea, smart education is a national project which is expanding through elementary, middle and high school. Using smart device and introducing digital textbook, teachers motivate students to participate activities in classrooms. Smart education is a study to improve results of education through cooperative and project learning method, interaction, union of convention study and non-convention study. In this paper, we introduce the Korean Ministry of Education in 2013-2014 defines a smart education as alternative form of teaching system, not as education based on smart device and digital text book. We also show the smart education project with digital text book for 21C students’ skills in South Korea.

**Keywords:** Smart Education, 21C Students Skill, Digital Textbook, Smart Learning Project

1. Introduction

Recently because of introduction of smart technology and its convenience, a smart media applies to teaching and learning method and systems known as “Smart Education” In South Korea, smart education is a national project which is expanding through elementary, middle and high school. Using smart device and introducing digital textbook, teachers motivate students to participate activities in classrooms. Smart education is a study to improve fruits of education through cooperative learning method, interaction, union of the convention study and non-convention study. By using smart device and their application, students find a phenomenon through self-directed learning ability and strength their ability to do their original works.

Also through smart education and social network service, students can cooperate and commutate other peers. These activities can help students to share ideas, to improve social relation network, to strength fellowship among peers to achieve their goals. Especially having social network service, smart learning environment contain potential merits of social network such as swift delivering educational lessons therefore teachers can expect increasing intimacy between teachers and students.

Likewise, teaching & learning method based on smart learning, not only it will increase students to do original works from collecting, analysing and using data but also it will increase students to work efficiently and collectively. Teachers can expect scholastic achievement and self-directed learning from these activities. Through this new technology-based instruction, we expected students have the 21C student skills. The 21C student skills followed a framework developed by P21 (Partnership for 21st Century Skills). The key elements of 21st century learning are represented in the graphic and descriptions below. The graphic represents both 21st century student outcomes (as represented by the arches of the rainbow) and 21st century learning support systems(http://www.p21.org).

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In this paper, we introduce the Korean Ministry of Education in 2013-2014 defines a smart education as an alternative form of teaching system, not as education based on smart device and digital text book. We also show the smart education project with digital text book for 21C students’ skills in South Korea.

2. Smart Education Project in Korea

2.1. Overview of Smart Education

The Korean Ministry of Education has established a smart education project since 2007. The research model schools of smart education were actually operated in 2011. In 2012, 63 schools were designated research school using smart devices and its were extended 144 schools. The table 1 shows the smart education model school in Korea.

Table 1. Smart Education Model School In Korea

<table>
<thead>
<tr>
<th>Model</th>
<th>School</th>
<th>Seoul</th>
<th>Busan</th>
<th>Daegu</th>
<th>Inchon</th>
<th>Gwangju</th>
<th>Daejeon</th>
<th>Uljin</th>
<th>Sejong</th>
<th>Gyeonggi</th>
<th>Gyeongnam</th>
<th>Chungbuk</th>
<th>Chungnam</th>
<th>Gyeongsangnamdo</th>
<th>Jeju</th>
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</thead>
<tbody>
<tr>
<td>A-Type (Digital Text</td>
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<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>2</td>
<td>1</td>
<td>2</td>
<td>23</td>
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<tr>
<td>Book Model)</td>
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</tr>
<tr>
<td></td>
<td>Middle School</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
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<td>4</td>
<td>6</td>
<td>54</td>
</tr>
<tr>
<td>B-Type (Smart Learning</td>
<td>Elementary</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td></td>
<td>High School</td>
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<td>4</td>
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<tr>
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<td>8</td>
<td>16</td>
<td>9</td>
<td>144</td>
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</tbody>
</table>

This attempt was the national project has unprecedented in the world and has received the attention of the world. Various attempts have been reported, practices, and results of these studies have focused research model schools.

2.2. Practices of Smart Education

In Korea, the Ministry of Education defined the smart learning as alternative form of teaching system, not as education based on smart device. A summary in the below shows the major definition of smart education system.
It just does not mean the smart education is new instruction using various smart devices. But it includes philosophy that the students have 21C learning skills.

**Fig 2. Definition of Smart Education in Korea**

**S: Self-directed**
- (Educator) changing roles of students from educator from learners. Changing role of teachers from educators to mentor.
- (Design intellectualization) Online achievement & course System helps students do learn themselves.

**M: Motivated**
- (Experiences system) From standardize curriculum to experience based education system.
- (Center solving problems) How to solve problem creatively and having customized education based on process of solving problems.

**A: Adaptive**
- (Flexibility) Increase flexibility of education system, lead students to find their goals from their preference.
- (Individualization) Transform school from knowledge institution to a place where individual students can find their potential ability and lead them to reach their dream.

**R: Resource Free**
- (Open market) Based on cloud education system, Individual/public contexts can apply to education.
- (Social Networking) Expanding collective education from Collective intelligence. Social learning, etc.

**T: Technology Embedded**
- (Open minded) From information skills, students can learn from any place, any time. Increase diverse methods to deliver message to students.

At smart educational institution firstly, teachers’ training has been processed, and making a classroom to fit smart learning. Also, South Korean Government provides student in research model schools various smart devices like a pad, tab, notebook, smartphone, and so on. So the students can learn education even they are in outside of classroom. Especially experience activities such as outdoor activities, students actively participate in a learning using smart device. In other words, smart learning maximizes education achievement from balancing between experience and curriculum. Especially SNS(for example Classting; Korean social
network service system) which used by many teachers has been expanded so much, teachers can access the system easily. Smart education along with digital textbooks is becoming a model for world education, even president Obama praised merits of digital textbooks. In present to future, South Korean smart education will develop more efficiently by teachers and supports from government. Figure 3 shows educational SNS of smart education system in South Korea.

3. Digital Text Book Project

3.1. Overview of Digital Textbook Project

In 2014, Korean Ministry of Education changed to digital textbooks-based project for smart devices-based project. Because students and teachers need above all various contents to apply a new teaching and learning strategies, we decided such changed policy. Firstly, we designed the structure and function of a digital textbook. Figure 4 shows an overview and structure of digital textbook. And we developed 3 textbooks as Social Studies, English and Science subject contents.
3.2. Advanced Teaching Learning Strategy using Digital Textbook

In 2014, Korean Ministry of education selected 450 schools for the digital textbook project. Also local province departments of education selected various typed schools of the digital textbook project. Now this project is spread across the country.

In order to apply real class-room, we developed the various teaching and learning models for smart education with the digital textbooks. Moreover, we developed a special community site(named Wedorang) and associated commuty to improve the learning effect. Figure 5 shows Wedorang community system for digital textbook project.
4. Conclusion

In South Korea, the school has applied the new teaching and learning approach using smart devices. This project is highly innovative at a national attempt in the world. It is expected that the student skills to height using the smart devices and digital textbooks for education. It also causes the problem of adverse information in these educational projects. Many parents worry about the game addiction, personal information disclosure and a cyber crime. However, the share of education possible to solve these side effects. We should dramatically change the existing educational environment and services in a positive attitude with new technology. Korea government will continue to pursue efforts in educational system during 4 years at least. In 2017, all students across the country will receive the benefits of the smart education services a use of digital textbooks. The figure 6 shows the roadmap of this vision in Korean education.
References


[4] Marilyn Binkley, Ola Erstad, Joan Herman, Senta Raizen, Martin Ripley, Mike Rumble (201), Draft White Paper 1 Defining 21st century skills


Short professional profile of the speaker:

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By means of crowdsourcing, Web 2.0 technologies generate a lot of data every day. As a result, an information overload is created which confronts the users with new challenges in filtering out just the relevant data. Furthermore, there are many specialized communities which are characterized by a homogeneous level of education and specific learning targets.

This contribution presents the novel learning platform “Wiki-Learnia” which helps to connect different educational environments. It is a central place for finding, creating, discussing and working with individually tailored learning content. For this, it consists of four components: the so-called “learning hub” based on a semantic meta-search engine, intuitive authoring tools, a social network and specialized mechanisms that support the learning process. The former one scans connected learning repositories to deliver adequate content in all conceivable learning types, for different target groups and in any data types.

By means of collaborative authoring tools, users are able to create their own content. In this way, they can repeat what they learn and distribute their knowledge to others, which provides them with teaching skills. All tools are fully embedded in a social environment where users have their own profiles, can connect to each other and build learning groups. Different communication mechanisms enable a lively exchange of experiences. Thus, users learn how to learn as well as achieve essential social skills and further media skills. Besides the content, Wiki-Learnia combines and offers different learning services. It helps to connect people who need tutorial support with experts. In the same way, a user can find an institution to achieve a certificate about the newly acquired skills, which can be presented with all other competences in a personal e-portfolio.

1. Introduction

“Lifelong learning” [1] is a process that accompanies us through the entire life. Due to constantly growing and changing demands in the workplace as well as changing goals and needs in private life (hobbies, volunteer activities) the formal educational processes (school, university, further education) are no longer sufficient. Non-formal and informal learning are increasingly gaining in importance [2][3]. They require a higher degree of self-organization and discipline.

A big help in all these learning phases can be Web 2.0 based communities. By means of crowdsourcing based on different technologies like wikis, blogs, forums and social networks, people with similar learning targets and skill levels come together to produce and consume content cooperatively (“prosumers”). In this way a wealth of learning material and communities has emerged. Since this is an ongoing process, there exists an information overload confronting learners with new challenges in finding appropriate learning partners (groups) and filtering out just the learning target related content.
This contribution presents a novel learning platform called “Wiki-Learnia” which connects different learning communities and helps finding user context related material, users and services. Taking into account the key competences for lifelong learning, the next chapter will give an overview of the Wiki-Learnia platform with selected features.

2. Wiki-Learnia – A platform for lifelong learning

Wiki-Learnia is designed to be a central place for finding and creating individually oriented learning material; for organizing learning processes; as well as for fostering the communication between participants. To achieve these core tasks, there are four components:

• the learning hub, consisting of a semantic meta-search engine with links to various repositories like Massive Open Online Course (MOOC) portals, online encyclopaedias, video platforms, news feeds, social networks and many more;
• collaborative “What You See Is What You Get (WYSIWYG)” authoring tools for creating multimedia-enriched learning modules (images, animations, videos, books, simulations, games, quizzes, etc.);
• mechanisms to support the learning process like setting up learning targets and learning paths, providing e-assessment solutions, tutorial support and certifiable partial qualifications;
• an independent social network with integration of external portals (e.g. Facebook, Twitter, YouTube), cross-network communication and e-portfolio.

The following paragraphs will describe the components in more detail.

1.1. Learning hub

The learning hub is a main component of the entire system. It helps to find learning target oriented material and connected people, e.g. authors and tutors, which may deliver different learning services like private tutoring and certifiable examination processes. By means of a semantic meta-search engine, the learning hub is connected to several external web sources that provide content for different learning types, for different target groups and of different data types (see Fig. 1).

To find content which is tailored to the own learning context based on individual learning preferences, skill level, learning targets and more, the semantic meta-search engine sends several parallel executed requests to the connected repositories. Afterwards, results are collected and different filtering and ranking algorithms are used to extract only the relevant data. This includes mechanisms which analyse meta-data like source, data type, creation date and author, as well as semantic exploration of the content. The individually tailored material can be accessed directly via the active search engine or indirectly through the system-wide integrated recommendation system which always provides interesting results from all related learning repositories.
In this way, people can get access to matching content in every learning phase of life to achieve the necessary expertise in all fields of activity. By also finding content-connected persons, institutions and services, it is even possible to get in contact with experts for individual tutoring or to acquire a certificate of the achieved personal progress.

1.2. Authoring tools

Wiki-Learnia is not only a portal for finding external data, but it also provides various authoring tools to create own learning content. As the platform name implies, a wiki software is used which allows every community member to create own content. Since the standard version of this tool (e.g. as used in Wikipedia) only supports collaborative editing of simple text-based contents, a number of extensions have been developed to enrich the material with multimedia data from numerous external sources of the learning hub. In this way, YouTube videos, Flash simulations, learning games, Google books, e-lectures, news feeds, quizzes and many more can be included.

Based on an integrated versioning mechanism and a discussion functionality, users can dispute individual content changes. Discussing the findings with the community increases the understanding of the facts which enhances the learning effect. By the way, people learn how to reflect and present newly acquired knowledge to other users, which provides a major contribution to their social skills.

In addition to the wiki editor, there are two tools to create special multimedia content. The first one is used to create e-lectures – with presentation slides synchronized with video recordings – via a native app on smartphones or tablets. By means of integrated peripheral devices (camera, microphone), users can capture lectures, speeches or just personal memos and add suitable slides. The result can be included as one video file into Wiki-Learnia content. The second tool is a web editor to create so-called “video quizzes”. This allows the author to include self-assessment quizzes into videos (also from different platforms, e.g. YouTube) at certain points in time. Depending on the answer to the question, the video either continues normally, jumps to another location or refers to completely new content.

By using all these authoring tools, people learn to work with modern web technologies in different environments (within a social network platform or by using an app for mobile devices). This improves the sense of initiative by learning to produce and distribute own learning material which represents their understanding of a special issue.

1.3. Learning support

At the beginning of each learning process is the defining of a learning target. This can be chosen either manually by the user or automatically by the system based on the history of consumed content. The already illustrated learning hub uses this information to get suitable content from the linked learning repositories. Furthermore, the internal recommendation system selects entries based on the current learning target. In addition, users with the same or similar objectives, learning preferences and skill level can be located and can be aggregated into learning communities. In this way, Wiki-Learnia helps to combine different educational communities within one platform which provides individually tailored content to each community.

Based on the WikiTrails approach [4], the user is offered (semi) automatically generated learning paths that help navigating through the information overload. They are the result of observing individual user histories while learning. Using different linkage strategies and taking into account community ratings, independent learning paths are created. Thus, people can use the predefined learning paths instead of doing their own research to find which resources are most appropriate.

To further support the learning process, there are two tools for creating personal learning materials. The “Annotator” allows users to attach their own comments to the wiki content. In this way, certain paragraphs can be marked as important or some external links can be added. Users can also share their annotations with friends which promotes collaborative work. The “Summarizer” tool is used to create individual summaries. For this, elements of any Wiki-Learnia content can be marked and added to the private summary.
Afterwards, this summary can be edited i.e. by rephrasing sentences or adding some extra information. Finally, the summary can be printed, copied to a mobile device for learning on the way or it can be shared with friends.

The presented mechanisms and tools for learning support help people learning to organize their learning process independently. Wiki-Learnia gives assistance for people to learn how to learn. By means of the sharing features, learners get in contact with other like-minded users. In this way, they see how other people learn and can draw conclusions on their own learning process. This type of self-reflection and the associated critical analysis of their own abilities allow the individual to focus on developing certain competencies.

1.4. Social network

Based on the ideas of Connectivism [5], Wiki-Learnia supports the interconnection of people to allow the mutual exchange of experiences as a learning medium. For this, an independent social environment is used. Community members can create a social profile which depicts personal descriptions as well as acquired skills and competences in an e-portfolio. By means of several communication tools, users can share information with each other and discuss learning topics. Fig. 2 shows that all fundamental communication types are supported by the internal tools of Wiki-Learnia. This enhances different key competences like digital skills by working with modern web technologies (social networks, chats, forums etc.) and especially social skills by interacting and cooperating with other users of the community.

Besides the internal communication, Wiki-Learnia connects external social networks to enable a cross-network communication. Similar to the concepts of web applications like Friendica, Diaspora and Social Igniter, users can link their accounts of other portals with the Wiki-Learnia account to import, export and synchronize messages (private messages, chat messages, bulletin board messages and more) on the so-called “Wiki-Learnia Wall”. This tool aggregates all messages from the linked networks (including Wiki-Learnia) into one central place. By means of different filters, users can only view the data of individual networks or extract learning target relevant information from all networks.

By these versatile communication options, lively discussions even beyond network boundaries are enhanced. Additionally, this helps connecting people with similar learning objectives into cross-network learning communities. These also include authors, tutors and institutions that provide different learning services like private training or certification processes.

References


Short professional profile of the speaker:

Ingolf Waßmann – received his master’s degree in computer engineering at University of Rostock, Germany in 2012. During his studies, he worked as a student assistant in different fields such as vehicular communication networks and optimization of energy efficiency of data centers. Since May 2012 he is a research assistant and doctoral candidate at the Research Group of Computer Architecture at University of Rostock. His research interests include learning processes in connected learning environments influenced by Web 2.0 technologies. A main part of his work is the development of a novel eLearning platform based on social environments combined with Web 3.0 features.
About one third of German students abandon their course of study before regular closing - about 38% of them due to lack of motivation and performance problems. As the German industry lacks skilled personnel, the high drop-out rate of students has become a big problem.

The program Media-based Junior Studies of Rostock University has the goal to reduce students’ drop-out rate by early development of competences, which are necessary for later university studies. Regular lectures from university are captured by the latest video technologies, extended with interactive tools and mechanisms, which are provided by the Internet. The pupils are able to participate virtually in regular lectures independent of time and location. They acquire two competences which are needed for their later university studies:

1. Pupils learn how to organize their study and how to learn independently. They are able to understand the learning methodologies and the processes at universities. Such a preparation of tomorrow’s students reduces lack of motivation caused by integration problems into university life.
2. Pupils are able to get a first impression of their potential courses of study. They can even pass exams and obtain certificates which are accepted during their later studies. Eventually, pupils may recognize that a course change may prevent frustration.

To achieve these goals, Media-based Junior Studies employ the latest technologies for communication and online or offline content distribution. A social learning platform has also been developed which combines online communication with a novel interactive video lecture capturing. Thus, pupils are able to deepen their knowledge by doing exercises and by discussing the content with tutors, lecturers, and other learners. Until now about 900 pupils from all over Germany and even some other countries (e.g. Namibia, Great Britain) participated in the Media-based Junior Studies.

This presentation will introduce the process of Media-based Junior Studies and the employed tools. Furthermore, it discusses our experiences.

1. Introduction

One of the most considerable changes in the life of young people is the transition between high school and university. This transition is characterized by a heavy change in private life as many pupils leave the home of their parents. For the first time, they start their own living forming new relationships [1]. Furthermore, this
transition includes a significant change of the learning environment: For learning in a university context, students are required to learn self-reliantly and to organize their study themselves.

Current studies show that in some countries like USA, New Zealand, and Sweden about 50 % of the students abandon their course of study before regular closing. In Germany this dropout rate is 33.2 %, which is still higher than the OECD average of 31 % [2]. A German study [3] from 2008 shows that only 31 % of the dropouts were caused by accomplishment problems or failing an exam. Thus, many students fail due to organizational reasons, e.g. lack of motivation [3]. One way to reduce the dropout rate is early preparation of pupils for university in order to precautionary reduce frustration and to ease their settling down in a new learning and living environment.

2. Media-based Junior Studies

The program Media-based Junior Studies of Rostock University in Germany has the goal to reduce students’ dropout rate by early preparation of pupils for the transition to university. Pupils should gain insight into university learning processes and the organization of learning modules and exams.

As pupils usually have a quite tight time schedule of their school lessons, it is rarely possible for them to visit lectures live at the university. Using Internet-based video lecturing enables them to participate without any restrictions in time and location. Thus, using this approach enables pupils from all over Germany (also from small towns without any university in place) and even from other countries to take part in university preparation.

Thus, to realize Internet-based video lecturing, regular lectures of the first and second semester of many study courses at Rostock University are captured by the latest video technologies and extended with interactive tools and exercises. The lecture videos are filmed during a normal semester and allow an authentic view on the university teaching process. The videos are extended by a time-dependent depiction of presentation slides and they also allow scrolling within the lectures. Thus, it is easily possible to stop a lecture and continue at a later point in time or to repeat a part of the lecture, if the content was very complicated. The enhanced video material even enables users to do full-text searches within the slides to find parts of lectures with used keywords. Furthermore, exercises, quizzes, and other tests are offered and assessed to reinforce the acquired knowledge.

The learning concept of Media-based Junior Studies implies responsible and process-oriented learning offering complex learning situations to be actively shaped by the learner himself. This learning approach, which is based on constructivism, is especially supported by the provided learning management system. The learning environment offers a broad range of communication mechanisms like virtual chat rooms, private messaging, community-based communication, which are important for pupils with less background about the context of the lecture content. They have the ability to contact other learners and discuss problems as well as to ask a tutor regarding the lecture content. Therefore, we provide an online tutor for every lecture. He is a competent contact person in case of questions regarding the lecture content.

Some of the offered lectures can even be completed by an official exam, which can later be accepted during the regular studies. Thus, pupils do not only get a first impression of learning at the university – they can even acquire professional competence in their potential course of study and thus, can better decide if the later profession suits their imagination.

3. Evaluation

The Media-based Juniors Studies started in 2008 with only a couple of pupils and courses and has constantly been extended. In the current winter semester 2014, there are about 200 pupils visiting our online lectures. There is a broad offer of about 40 basic courses from most faculties – starting from electrical engineering and computer science, to medicine, biology, chemistry and humanities. Altogether more than 900 pupils from all parts of Germany and even beyond have participated in the program since 2008.
To get an impression of the pupils’ satisfaction with our online learning approach, the project has been evaluated by the Institute of Educational Psychology Rosa and David Katz. Pupils of one semester have been asked to respond to two online questionnaires at the beginning and end of the examined semester. The complete results are presented in [5]. Some important facets of this study are briefly summarized hereafter:

- School grades of participants are not influenced. In particular, this means that pupils are not overstressed by the additional learning tasks.
- Junior students learn to organize their learning, e.g. by self-reliantly partitioning their learning content and including learning breaks.
- Junior students are satisfied with the learning system. More than 70 % are satisfied with the technical implementation of the online study course.

Especially the second issue shows clearly that the Media-based Junior Studies prepare pupils to learn self-reliantly, which is an important competence for university learning. Furthermore, pupils get a first impression of how university courses are structured and organized.

4. Preparation for Lifelong Learning

Our present-day pupils and students are growing up in a digital society where knowledge steadily increases and quickly becomes obsolete. Thus, the former learning process, which has been arranged in specific learning phases of life, becomes a lifelong learning process. In [4] eight key competences are recommended which are necessary to realize lifelong learning in future. The Media-based Junior Studies support learners in improving some of these key competences and thus, it is more than only a program to ease the transition between school and university – it is a program to support learners in improving key competences for a lifelong learning process.

In the following, key competences of [4] are presented in the context of the Media-based Junior Studies.

4.1. Mathematical Competence and Basic Competences in Science and Technology

The Media-based Junior Studies firstly connect pupils with a scientific way of thinking as it is taught at universities. Pupils learn to structure and formalize their tasks (e.g. by mathematical methods). This issue is emphasized by the fact that most pupils of the Media-based Junior Studies choose engineering and natural sciences.

4.2. Digital Competence

As in most distance learning approaches, pupils of the Media-based Junior Studies employ further information (e.g. from the Internet, journals, books) to broaden their knowledge. During discussions in the virtual learning community within the learning management system this collected information is reproduced in detail and discussed by members of the community. As professionals like tutors are involved in the discussions, problems and misunderstanding can be determined this way. Thus, the pupils learn to interpret information from third parties and learn to criticize them. They adopt a critical approach to information usage and communication technology.

4.3. Learning to Learn

This issue has already been explained in more detail. Participants of the Media-based Junior Studies verifiably learn to organize their study particularly individually but also in virtual communities.

4.4. Social and Civic Competences

For many students studying at a university is a major change in life as they are in a completely new social environment with novel relationships [1]. The contact with a new social environment can be trained during the Media-based Junior Studies as the pupils within one learning community usually do not know each other before starting the course. Thus, they can start training by introducing themselves in the virtual community. There is the necessity to participate in an effective and constructive way.
4. Summary

Since 2008 the University of Rostock offers pupils of high schools the possibility to be introduced to university life by an online virtual community system with online video lecturing. More than 900 pupils participated in this program to get an impression of their possible study courses before actually studying at the university. This paper introduced the Media-based Junior Studies and briefly presented important results from the evaluation of the program. It has been shown that the Media-based Junior Studies provide pupils with skills which are important for university studies and thus, may reduce the number of dropouts by reducing frustration during the integration process into university life. Furthermore, there are indications that the program also improves some of the key competences, which are recommended by the EU for lifelong learning.

References


Short professional profile of the speaker:

Daniel Versick – Senior Research Assistant, University of Rostock, Germany.

Dr. Daniel Versick is a senior research assistant at the Computer Architecture Group of Rostock University, Germany. He studied Technical Computer Science and received his Ph.D. from the University of Rostock in 2010. His research interests include distributed computing, high-performance I/O, virtualization in data centers and embedded systems as well as power consumption measurement and optimization of IT systems. As a passionate teacher he is strongly involved in research and development of e-Learning systems at Rostock University.

Dr. Versick is program committee member of several conferences i.e. with focus on distributed and green computing. He organized numerous scientific symposia and is author and co-author of various publications in his research fields.
Today, different educational programs are available. We can divide the educational programs in two ways. In one we differ between the educational period of learners: from the learning at the school over university up to further education during the live after the two first educational periods. All these periods differ in goals, structures, used tools and environment. The other way comes from the globalization: The students study more and more outside of their home countries. To reduce the language problems the learning institutions offer the programs mostly in English. So, we have principally two border systems, one between the educational periods and one between the countries.

Some of the available e-learning systems are used to overcome the different periods and also regional, national and international boundaries of learning. But their structures should be critically evaluated in order to draw tools which reduce the difficulties and help the realization of ubiquitous and borderless learning.

In our presentation after an explanation of different e-learning systems, their structures are critically evaluated in order to draw conclusions for a reorganization of such systems. The discussion results are reflected in the development of novel concepts like “learning hub”, “organized collaborations”, “virtual communities” etc. as well as hardware and software tools like “cloud” or “global communication which helps the user to find the most suitable learning content by gathering, reprocessing and evaluating materials from different learning repositories and individual tailored learning processes. We show that such systems combine the character of a social network with conventional learning management systems (LMS). Specially, by means of social media, Web 2.0 and Web 3.0 technologies, new services for cross-border study and acquisition of knowledge are realizable and thus a useful way can be realized to offer studying without borders.

**Key words:** Learning environment, learning periods, global learning, theory of organization
The EU founded LLP project SeCom2.0 (519373-LLP-1-2011-1-DE-KA3-KA3MP / 2011-4073), which was coordinated by RWTH Aachen, Germany from January 2012 until March 2014 focuses on the integration of a serious game component into a learning management system and a cooperation platform, to teach and educate undergraduate students and flood risk experts in a collaborative manner. Based on real data (terrain, operational and theoretical flood risk management resources) a dynamic and active system was developed which is able to identify weaknesses of and synergies between the involved stakeholders. The consortium (RWTH Aachen, Germany; Politecnico di Milano METID, Italy; TU Vienna, Austria; HKC Cologne, Germany; Zone2Connect, Germany) set a high value on the interconnection between all three systems, as to directly link from online courses in the learning management system to the game or from inside the game to (external) learning resources. Furthermore the game was set up as a single and multiplayer game, to foster collaboration and social competencies. An editor was developed to give the users the opportunity to build up their own game, based on the given terrain data and learn the results of various own scenarios by try and error and discovery. We will give an overview on the project outcomes, the serious game component as well as the learning platform. We will also present the results of the final surveys and give an overview on how it can be integrated into the syllabus of a University class or vocational training at flood risk related companies.

Floods in Europe

Although flood risk is an old challenge, the contents and tasks of the EU flood risk directive (EU FRD) and the lacking skills to realize them are not new to undergraduate students and flood risk experts. As always problems are worth solving them with modern technology and approaches, SeCom2.0 implements amongst other informal learning, problem based learning and peer learning in an ICT system, consisting of a Serious Game coupled together with a Learning Management System.

Playing and Game Based Learning

Huizinga wrote in [1] that playing is a voluntary action or activity which takes place in a framework of limited time and space, but with necessarily binding rules. The objective or reward of a play is included in the play itself. Furthermore playing should impart an awareness of being different than in real life. Salen and Zimmerman wrote
in [2] that “A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome”. According to Corti [3] some of the key potential benefits of Game based learning are performance improvement, competency testing and best practice. He also pointed out in [3] that “it is important to remember that games need not be a solitary, i.e. ‘single player’, experience! Some of the world’s most popular entertainment games are multiplayer games where players team up to work together. This brings about interesting opportunities for providing social learning environments such as, for example, around team dynamics.”

Going with Corti [3] who wrote that one of several issues in implementing game based learning is that “the technology used to develop game based learning has to have a higher standard than normal eLearning content, or even the older CBTs.” the serious games component was build up in an immersive 3D environment, based on real world data. So the learners feel really like to be inside a simulation rather than solving unrealistic problems.

Can we always use Serious Games in Education? No we cannot as Kurt Squire states in [4] where he writes, that using Civilization III in a history classroom works well for “those students for whom a traditional education is simply not working” and “Students who do well in the classroom, however, are more reluctant to view gaming as a legitimate learning tool and experience much more frustration when playing the game”. But citing Gee who writes in [5] that “while e-learning has a reputation for being dull and ineffective, games have developed a reputation for being fun, engaging, and immersive, requiring deep thinking and complex problem solving.”

The SeCom2.0 environment

The SeCom2.0 learning environment is three folded. Connected by a database layer the Serious Games component is coupled together with a collaboration component and a learning management system (see Figure 1 and Figure 2). The development of the environment and especially the learning goals are based on a survey addressing undergraduate students and flood risk experts. The outcomes led to the pedagogical design as the basis for the platform. Learning resources based on the assessments where implemented from topics of

1. Knowledge of the concept, aim and expectations of the EU Water Framework Directive (EU WFD)
2. Knowledge of the concept, aim and expectations of the EU Flood Directive
3. Knowledge of flood general characteristics
4. Understanding the urgency and main principles of flood risk management
5. Knowledge about experience in flood risk management
6. Understanding the interrelationship between flood forecasting, warning systems and planning and operation

Experts from the nearly 100 members of the HochwasserKompetenzCentrum (Flood risk competency center) in Cologne, Germany gave input to the real life based flooding scenarios to be implemented by the development team.

The goal of the game is to solve a flooding scenario by operating with a given budget and managing to secure the city in a given time. The LMS component serves the learning resources and tests. The platform
consists also of a collaboration part, where stakeholders can upload and share best practice and flood-related content as well as communicate by using a web conferencing system.

**Testing phase**

After the development phase of the project the testing phase began, with interviewing internal project participants by the project quality control. Testing took also place at 2 different universities (RWTH Aachen and TU Kaiserslautern in Germany) by local students and by flood risk experts as well as by two independent companies. Correcting the exposed bugs and conducting the test phase for a second time with local students, two important outcomes were, that most of them found the game to raise knowledge and that it is fun to play (see Figure 3 and Figure 4).

![Figure 3](image1.png) 45% (blue) of the test users say, that the knowledge raises after playing

![Figure 4](image2.png) 54% (blue and red) of the test users say, that the fun factor of the game is high

**Integrating into Flood Risk Management class**

To integrate this platform into university classes, RWTH Aachen converted the resources of the Flood Risk Management class completely into digital form. The online course combines learning resources, knowledge assessment and further information together with direct links at specific dates to the Serious Games component. The game scenarios are created either by the lecturer as introduction to the game itself and to teach simple flooding scenarios, or the students are advised to create their own scenarios based on real world floods.

![Figure 5](image3.png) In single player mode, one player plays one area. In multiplayer mode, each player plays a different area and can exchange resources

![Figure 6](image4.png) Planning phase

![Figure 7](image5.png) Playing phase

![Figure 8](image6.png) Reflecting phase
To achieve that, a comprehensive scenario editor was developed where each registered person can develop own flooding scenario. For all four areas and all subareas (see Figure 5), the user is able

- to create global the hydrograph,
- to set up the amount and skill of the task forces,
- to allow certain preparation action the player can choose from,
- to set up the available budget, the player can deal with and
- define the damage which the flooded area will cause

Besides the game editor, certificates can be issued to the participants by the teacher, based on the playing results and tests from the corresponding online course. These certificates and the game ranking for each of the different scenarios forces the majority of the learners to compete against each other. This also lets the player know "whether if it is necessary to change their strategy" as Aldrich wrote in [6].

Conclusion

As SeCom2.0 could by far not implement all details of flood risk management and more ideas are in the pipeline, we are currently working on a successor project which will enhance the given platform and widen the scope of application in different directions. If you are interested in SeCom2.0, please visit our website at http://www.secom20.eu or the platform at http://www.platform.secom20.eu.

References


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Language learning in 3d virtual environments: 
the experience of the EUROVERSITY network

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Abstract: This paper gives an overview of the educational potential of virtual worlds and draws on the results of the EUROVERSITY project - funded with support of the European Commission under the Lifelong Learning Programme Key Activity 3 ICT. The paper describes the educational, pedagogical, cultural and motivational benefits of using virtual worlds in educational settings especially in the field of language learning. Teaching languages in virtual worlds often requires a new way of thinking in terms of how to use the environment in the learning process, and demands a completely new set of professional skills. The starting point of the Euroversity project was the development of the Best Practices Framework followed by the drafting of a set of recommendations for teaching and learning in-world. The process was developed through the systematic collection and analysis of Case Studies, description of best practice, teacher interviews and the administering of student questionnaires. In a time when our modern educational system is under fire for being disconnected from the real world, many teachers see virtual worlds as a tool that might help them to connect students to the real-life education through the technology of the virtual worlds.

Keywords - Virtual Worlds, E-Learning, E-moderating, V-Learning, language learning

I. INTRODUCTION

The EUROVERSITY network is a 3 year multilateral and transversal network co-funded under Key Activity 3 (ICT) of the EACEA LLP programme and pools together resources on education in virtual worlds and virtual reality from different subjects. The partnership brings together a range of public and private institutions from across Europe (18 partners from 10 EU countries) who have experience in the use and development of online virtual platforms for education across a range of disciplines, with particular focus on language learning, and contexts (lower and higher education, educational and business). Teaching language in virtual worlds often requires a new way of thinking in terms of how to use of the environment in the learning process, and demands a completely new set of professional skills. The project is coordinated by the University of Hull, started in December 2011 and it is currently in its final stages.

The starting point of the Euroversity project was the development of the Best Practices Framework followed by the drafting of a set of recommendations for teaching and learning in-world. The process was developed through the systematic collection and analysis of Case Studies, description of best practice, teacher interviews and the administering of student questionnaires.

In a time when our modern educational system is under fire for being disconnected from the real world, many teachers see virtual worlds as a tool that might help them to connect students to the real-life education through the technology of the virtual worlds. Part of this enthusiastic approach comes from the unique characteristic of virtual worlds: they give students the ability to play, to practice, to be creative and imaginative, and to do things that they don’t or can’t or can’t yet do in real life.
II. WHY VIRTUAL WORLDS?

A virtual world is an online community or computer-based simulated environment where users can interact with one another and use and create objects. Virtual worlds or interactive 3D virtual environments, allow users to inhabit through their avatars, a 3D graphic representation, and communicate through text, graphical icons, visual gesture and sound.

Virtual worlds represent a powerful new media for instruction offering a wide scope of tools for social interaction and innovation in learning to encourage student participation. Virtual worlds have the ability to adapt and grow to different learner needs and can overcome the limitations of a traditional classroom setting where certain tasks can be difficult due to constraints (i.e. cost, location, etc.). The educational use of virtual worlds (v-learning) promotes learner empowerment by allowing students to customize their learning pathways, through virtual mediations and through the use of their avatar: these features help creating new learning experiences and reflection.

The term “world” and “reality” are used commonly in an attempt by the creators and users of these environments to describe the computer simulated space in which players are active. And, in the ned, as all computer simulations are created or designed by people, they inevitably express, represent and reflect those human understandings of space, worlds and reality which are embedded in our cultural and experiential knowledge (Getting started in virtual worlds with the EUROVERSITY network, Luisa Panichi, Christel Scheider, International conference “ICT for Language Learning” 5th Edition, Pixel).

Virtual worlds technologies are not without their obstacles. Currently, we assist to an explosion of virtual worlds technologies and each of them exists into itself; “travel” between them as a single user or identity is largely not possible and each world implements a different combination of toolsets, communication features and resources. Diametrically opposite to the web, which is based on standardized protocols that work across many platforms, virtual worlds technology are still largely based on closed and proprietary systems.

Education institutions are forced to choose the virtual worlds platform to be used. From an educational perspective also the way how virtual worlds technologies integrate with existing e-learning platforms must be considered. Actually, most virtual worlds platforms are proprietary and the technical standards that allow interoperability between different systems have not yet been developed.

III. LEARNING PERSPECTIVES ON VIRTUAL WORLDS TEACHING AND LEARNING ACTIVITIES

When deciding to introduce a new digital tool, such as a virtual world, into teaching and learning activities, one is not just adopting that tool but adopting a certain perspective on teaching and learning and a new set of roles for teachers and pupils that accompany this perspective.

This means that one cannot just transfer teaching and learning activities from one context, the traditional classroom, to the new context, the virtual world. How the features of the new context can be applied to best support the fulfillment of the specific learning outcomes of the course must be considered.

The use of new technologies as a support to training involves new active and collaborative teaching models that reduce traditional methods. The use of virtual worlds offers the possibility to use different communication codes at the same time: visual, verbal, perspective. The use of immersive 3D environment, instead of plain text, is expected to provide more vivid information which is also easier to understand, and to provide also adapt stepwise explanations on the integration of proposed tools and technology into existing teaching practices. Inquiry and project-based learning activities use a graphical 3D application that builds on the students’ curiosity and motivates students to reflect on what they are learning. Campbell’s study show that teaching and learning activities in virtual worlds help pupils develop competences that can be used in other contexts as well be it school projects and/or their future work life (Campbell, 2009). The study was conducted with a group of pre-service educational students as part of a final year course in educational technology. They completed a problem-based learning experience in Second Life that allowed the students to explore the
virtual world as well as to develop a course that could be taught to a high school class. It is suggested that manipulation and problem-solving skills that the students evolve when learning basic Second Life related skills are transferable to other activities. Other results referenced are the improvement of communication, teamwork, creativity and leadership skills.

The Six Learnings Framework (Lim, 2009) presents six lenses through which curricular interventions might be analyzed and evaluated, and suggests that learning goals in virtual worlds can be maximized only if there is a mutually respectful relationship between school managers, teachers and developers informed by these Six Learnings (Lim, 2009, p. 6). The six lenses pointed out are as follows: learning by exploring, learning by collaborating, learning by being, learning by building, learning by championing, learning by expressing.

IV. LANGUAGE LEARNING IN VIRTUAL WORLD: ADVANTAGES

Language teaching methodologies in virtual worlds is a matter of study of researchers and teachers, who identify in 3D environments a tool suitable to teach any foreign language.

One of the main aims of language learning in virtual worlds is to achieve a level of competence that goes beyond the mere acquisition of the rules of a given language, covering all aspects of communication (namely the linguistics, sociolinguistics, paralinguistic and extralinguistic competences). Many tools available in 3D virtual environments allow to flexibly manage the avatar (facial expressions, gestures and movements, animations, clothing, accessories) and offer a simulations of real environments bringing together all the components of linguistic and communicative competences. Each activity performed on virtual platform aims at the development of language skills.

The main advantages of language learning in virtual worlds can be defined as follows:

- **Overcoming limitations of the traditional classroom:** holding English language classes in the streets of London, or Russian language in a Moscow square is no longer an opportunity reserved to a small number of students who have time and money, but becomes a possibility open to all.

- **Learning different communicative registers:** students carry out activities that push them to interact with speakers from different areas allowing them to use different linguistic style according to the specific situations (young people who use a colloquial register or groups of users from a specific language area, but also more formal environments).

- **Paralinguistic competence:** Users carry out activities in which the communication takes place mainly through the use of voice chat that makes help enhance the non-linguistic communication components.

- **Overcoming emotional barriers:** The VW allows to create a relaxed learning environment in which the students have the opportunity to fully develop their skills and abilities.

- **Learning by doing:** This experiential context, reproducing as closely as possible real life situations allows the student to move in a controlled and protected environment in which, through direct experience, he learns by doing.

V. THE GOOD PRACTICE FRAMEWORK

**What is it**

The Good Practice Framework is a manual, developed within the Euroversity Project, that aims at providing guidance for organisations and individual teachers in getting started with teaching in 2D and 3D virtual worlds (for example Second Life and Club Penguin) and other virtual reality environments. The information found in this guide has been drawn from a range of different projects and teaching experiences, both from public and private institutions from across Europe and in Israel.
These participating institutions have experience in the use and development of online virtual platforms for education across a range of disciplines (i.e. language education, cultural studies, literature, economics, religious studies, media studies, intercultural communication, digital design, computer science and software engineering, science) and contexts (lower and higher education, educational and business). The models for learning in virtual reality can vary from courses (AVALON project www.avalonlearning.eu/) (AVATAR project www.avatarprompt.eu) to blended learning (START project) and references to these experiences can be found throughout the manuscript.

The guide aims at supporting other practitioners on best practice implementation of courses/learning events within virtual reality. This guide is designed for educators as a basic introduction to help in the transition into teaching in virtual reality environments. It is designed to be a practical start for those that want to use virtual reality for education. The aim is to help overcome some of the difficulties and obstacles you might encounter when starting teaching/learning in virtual reality environments. The Framework offers a basic overview of how to get started and what to think about if planning to use virtual reality to support teaching.

**The structure of the guide**

The manual includes recommendations about pre-course preparation, course implementation and evaluation and assessment and further guidance on organizational, technical and ethical issues. Best practices (reflections, evaluations, lessons learned) are described and discussed and more in depth resources are indicated where appropriate.

The manual has a modular structure, related to preparation, implementation and evaluation issues. Within the pre-course preparation section the focus is on the decision making process, aims and objectives of the course, funding, the environment and the learners, logistics and timetabling, course syllabus and advertising.

In the course implementation section the following issues are tackled: technical issues and support, interaction, resources and ethical issues. Finally, the third section (post-course) deals with the assessment and evaluation part. Throughout the guide EUROVERSITY specific documents (case studies) are combined with links to good practices. All EUROVERSITY partners have contributed in one way or another to the assembly of the guide; therefore, the manual includes examples from different disciplines and subject areas. However, it aims to be general in its approach while pointing to the existence of literature and information for the teaching and learning of specific subject. This EUROVERSITY “Good Practice” is available on-line and is downloadable on Euroversity Project website.

**VI. CONCLUSION**

It is unfortunate that we often talk and think about virtual worlds in education as a kind of technology-application rather than as an exciting new laboratory, or as an open sandbox to test new theories and educational activities, or as a way to step into our collective and individual knowledge in a way that we have never been able to do before.

In many ways, teachers involved in virtual worlds today resemble the educators who pioneered web-based distance-learning programs and faced similar barriers a decade ago, as they focus on ways to improve learning outcomes regardless of the platform.

In a time when our modern educational system is under fire for being disconnected from the real world, many secondary school teachers see virtual worlds as a tool that might help them to connect students to the real-life education through the technology of the metaverse. Part of this enthusiastic approach comes from the unique characteristic of virtual worlds: they gives students the ability to play, to practice, to be creative and imaginative, and to do things that they don’t or can’t or can’t yet do in real life. But virtual worlds move beyond authentic real-life learning.

The first results obtained from the experiences and pilots of the Euroversity project shows that the added value of teaching in a virtual world points towards cultural, linguistic, interpersonal and motivational benefits and a massive and enthusiastic participation to the collaborative activities has been observed.
Virtual worlds, embedded in an appropriate pedagogical approach, seem to contribute to enhance collaborative learning, learning by reflecting and learning by doing approach as well as learner autonomy and social empathy. The combination of this positive attitude, together with the educational potential of the metaverse, can lead to very motivating, enriching and satisfying learning and teaching experiences as the results of the experience of the Euroversity project seems to indicate so far.

VII. REFERENCES

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Short professional profile of the speaker:

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CAMELOT: 
CreAting Machinima Empowers Live Online Language Teaching and Learning

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CAMELOT is a 2-year EU funded project for language educators to learn how to create videos (machinima) in virtual worlds. (Dec 2013-Nov 2015). CAMELOT is unique in that it aims to promote the role of video production in language teacher training. It is innovative in that it takes one of the latest technologies – machinima – and uses it to empower 21st century language learning and teaching through the use of a) user-generated video content, b) a task-based language teaching approach based on learner engagement, authenticity and creativity, and c) an online community of practice in which open educational resources (OERs) are available via a repository. Machinima is a neologism deriving from machine and cinema and refers to the use of real-time 3D computer graphics to create and record cinematic productions. The actors in machinima are avatars and the environments they inhabit typically belong to a virtual world such as Second Life. Action within the virtual environment is recorded with the use of screen recording software and the productions are sophisticated and authentic as well as lean and cost-effective. Machinima can be used to simulate real-world interaction and dialogues in realistic 3D environments.

The aim of CAMELOT is not simply to provide a set of language teaching resources that instructors can use, but to provide the technological and pedagogical know-how for teachers to create and adapt machinima for their own particular EU teaching environment. CAMELOT fosters the development of an EU-wide approach to language learning and teaching that is appropriate for the 21st century.

1. Motivation for the Project

The Lisbon Key Competences (2006) underline the importance of language learning, online learning and intercultural communication among the key priorities. With ever increasing widening participation in education and the turn towards open access in educational resources, it is important to identify new ways of engaging learners utilising new pedagogies and new technologies to motivate language learners in the pursuit of lifelong education. The motivation for the CAMELOT project (CreAting Machinima to EmpowerLive Online language Teaching and learning) derives from this network of key factors.

Moving pictures, sound and stories are becoming one of the most powerful ways of communicating learning content in the digital age. An increasing number of learners today across all educational sectors use digital video as the favoured means of communication. Youtube has become the second most popular online community after Facebook and the second largest search engine after Google - not only as a tool of self-expression but also as a tool for learning. CAMELOT derives from the shared interest of the partners in the use of a new generation of cost effective digital video tools and applications to enhance the student experience in an EU language learning context.
Compared to language learning conversations recorded with traditional technology, there is a distinct difference in the case of recording in virtual worlds such as Second Life. In the latter, learners can join online environments and navigate to the virtual site where the videos were shot and re-enact the conversation with avatars at hand. This is independent of the location where the learners connect. This is why the process can be referred to as *live video production*. The distinctive foci of CAMELOT are evident in four main development areas:

- Language learning in authentic virtual environments with a task-based approach
- Real-time animation video production
- Field testing *machinima* across four educational sectors (school, HE, adult education, and vocational)
- Teacher training course and pilot test

*Machinima* can record authentic conversations in situated learning contexts. Digital storytelling and emoting (a way of expressing action in the third person singular, often used in roleplay) are important new skills that learners and teachers acquire in the process of creating *machinima*.

The technical challenges of producing real-time animated videos in 3D environment are manifold: traditional film production techniques include recording, camera control, editing, storyboarding, costume design, designing settings and drafting scripts [1]. A pre-requisite is familiarisation with the 3D environment and its inherent technical challenges of navigating, avatar movements. After editing, *machinima* are uploaded to video sharing sites such as Youtube, Vimeo etc. Interestingly, such ubiquitous sites help exploit the created content because these videos can then be played even on mobile devices by interested learners. In CAMELOT the field test phase involves a number of data partners in various educational sectors with the goal of determining the best use of *machinima*.

1.1. *Specific Needs and Challenges*

While digital video presents learners and educators with numerous educational opportunities, CAMELOT is also aware of the technological and pedagogical challenges [2], especially in terms of presenting the structured and meaningful use of ICTs. CAMELOT takes up the challenge of ‘video as a new language of learning’ and proposes to train and equip language educators to produce authentic target language conversations in a visually appealing, motivating and highly engaging manner.

CAMELOT uses *machinima* to create cinematic productions. This technology produces 3D computer graphics in real-time, and is already used in video games and virtual worlds [3]. In these digital environments, avatars (or digital characters) take the role of actors and the stage is provided by computer generated imagery. The camera used to record the interaction of the characters is screen recording software, making these productions highly cost-effective. The finished videos, which are often highly sophisticated narratives based on intricate task planning by the learners, can be disseminated to learners and teachers as video-podcasts (or vidcasts), a more appealing genre than audio-only resources.

The aim of the CAMELOT project, then, is not simply to provide visually appealing, authentic conversations in the target language that teachers can readily use, but to provide the know-how, both technological and pedagogical, for teachers to create and adapt their own *machinima* to their own particular teaching environment. By providing example materials as indicators of the potential for language learning and training guidelines, both concerning the technical practicalities necessary to create *machinima* and how to use them, CAMELOT provides a range of educational benefits:

- Fit for purpose education—teachers can create learning environments for their students
- Learner autonomy – students learn and practice at their own pace
- Learner empowerment – learners can try a new language without feeling self-conscious
- Collaborative learning – teachers and students can jointly create environments
- Low cost and yet high quality video productions

By addressing these five areas CAMELOT combines cutting edge technology with an innovative pedagogy.
2. Investigating the Field

The use of immersive digital games and virtual environments has led to an increasing amount of research in the field of education over the last few years [4]. Developing from this potential, educators are now considering how the use of recorded video productions (or machinima) can be used to stimulate task-based learning, learner motivation and engagement in authentic contexts. CAMELOT deals with the use of machinima – recorded videos made in a virtual environment such as Second Life or within a digital game world, specifically related to the under-researched area of language learning.

*Machinima* is a portmanteau word that combines ‘cinema’ and ‘machine’ and refers to filming actions, role-plays and dialogues between 3D virtual characters or avatars. Learners and instructors engage in a variety of creative preparation and planning tasks such as rehearsing, scripting and storyboarding. Users can then edit and refilm where appropriate to construct a complex and sophisticated video narrative that is potentially of immense value in a variety of fields, equipping users with a variety of technical (or digital literacy) skills as well as presenting opportunities for language practice [5].

A number of *machinima techniques* have been identified and CAMELOT explores these specifically in the area of language education. The four most common machinima production techniques are: "straight recording", the "puppetry approach", "recamming" and "scripting". The first one is merely recording the activities of the avatars. The second one entails manipulation of avatars to perform actions based on a screenplay. Recamming is based on puppetry approach as re-recording the actions by adding additional avatars, changing lights or moving cameras. Scripting is programming avatars to perform in specific ways [6]. The value of *machinima* is in building connections between people who feel a strong affiliation with digital worlds and those who are new to them. The appeal of *machinima* is the range of skills that can be learned as well as the rich variety of ideas that can be explored.

3. Impact

The impact of CAMELOT is targeted at a number of areas, focusing in particular on the European language learning community, covering all four sectors (Erasmus, Comenius, Grundtvig, Leonardo da Vinci) via a cascading effect. Assuring the impact of the project and measurable outcomes are top priorities of all activities in the project. The synergies between practical language learning skills, digital literacy skills, learner creativity and innovative pedagogy through the use of creative commons licensing and open educational resources with make the CAMELOT community accessible and attractive to all target groups.

The commitment to open resources in particular as well as an online social networking community, will situate the project at the cutting edge of innovation and help us bring together key sectors of the language learning education world: teachers and trainers; the institutions they work for; teacher associations in Europe; the broader teaching community via teachers groups and conferences; the target community including schools, colleges, language departments and faculties of education at universities and polytechnics, companies, groups and individuals who require language training and stakeholders in the e-learning industry in general who may benefit from the *machinima* production sector in particular.

References

Short professional profile of the speaker:

**Tuncer Can**, PhD 2011, from Istanbul University, English Language Teaching Department where he currently lectures. MA completed in 2004 on “Constructivism”. In 2005, being granted a Fulbright Scholarship and he spent two terms at Syracuse University, NY, USA, where he taught Turkish via videoconferencing. Besides training pre-service language teachers, he has been teaching English to adults at all levels and has organized teacher training courses at the Language Center of Istanbul University since 2007. His research ranges from Constructivist Approach to using 3D Virtual Learning Environments in the context of foreign language learning and instruction. He has also managed and partnered in many projects like “Establishing the Virtual Campus of Istanbul University on 3D VLE,” funded by Istanbul University Research Center and “CAMELOT: CreAting Machinima Empowers Live Online Language Teaching and Learning” funded by European Commission, being the latest. He has been operating http://www.ingilish.com/.

**Irfan Simsek**, PhD, 2013, from Istanbul University, Computer Education and Instructional Technologies Department. In 2008, he was invited to Melbourne University as a visiting scholar for six months. He studied online education and undertook training courses using the Second Life platform. He also participated in a project in English Language Teaching Department at Istanbul University to implement Moodle in the training of pre-service foreign language teachers. He has also managed and partnered in many projects like “Establishing the Virtual Campus of Istanbul University on 3D VLE,” funded by Istanbul University Scientific Research Center and “CAMELOT: CreAting Machinima Empowers Live Online Language Teaching and Learning” funded by European Commission, being the latest. His homepage is available here: http://www.irfansimsek.com.tr/.
As used in a learning to learn context, strategic competence has a somewhat different meaning from the way it is used by Hymes (1972). In his well-known model of communicative competence, the term is used to refer to the ability to maintain communication. In the context of this talk, strategic competence will refer to a learner’s ability to learn effectively. In this sense, learning strategies can be defined as activities which are chosen for the purpose of regulating learning. Learners choose these strategies according to their situations (e.g. different countries, cultures, classroom, distance, English as a Medium of Instruction, etc.), goals (e.g. General English, exam preparation, English for Specific Purposes, Content and Language Integrated Learning, etc.), and individual characteristics (e.g. motivation, personality, style, age, beliefs, gender, etc.).

There are many different views about the best way to provide strategy instruction in order to develop strategic competence. In this talk we will suggest that an effective strategy training programme consists of raising awareness so that learners are familiar with the options they have available; explicit instruction so that learners understand the process involved and can transfer this knowledge to new tasks; practice so that strategies become automatic and do not require deliberate decisions every time the learner wants to use them; and implicit reinforcement so that strategy development is consolidated without the need for repeated overt instruction which can be seen as wasting time by enthusiastic students who are anxious to make progress with their subjects. In this talk, the presenters will explain all of these concepts, review the existing literature and the previous research, and suggest pedagogical implications as well as areas still requiring further research.

1. Introduction

The definition of the language learning strategy concept has long been controversial, but a review of the literature suggest that LLS are active (learners cannot be passive, and strategies are therefore commonly expressed in verbs, either the gerund – e.g. visualizing – or the first person – e.g. I visualize……); they are chosen by learners (it is impossible to force a learner to use a particular strategy, although this choice can be deliberate or automatic); they are purposeful (a strategy is not random behaviour – there is always a goal); they are used to manage, control or regulate learning; and language learning strategies are for learning (as distinct, for instance, from communicating). Griffiths (2008, 2013) therefore, suggests a definition of language learning strategies as activities chosen by learners for the purpose of regulating learning.

When considering what language learning strategies are, it is also important to consider what they are NOT, since there are several similar or overlapping concepts with which they are often confused. It is important, for instance to distinguish the strategy concept from the concept of style (which expresses preferences, and is usually expressed as an adjective – e.g. visual, aural, kinaesthetic etc; style may, however, influence strategy choice – for instance, a visual learner, may well favour watching movies in order
to learn. Strategies are also not the same as skills, which are employed to use what has been learnt, although skills can be used as a strategy to promote further learning. And learning strategies are also distinct from communication strategies (e.g. gestures), which are used to facilitate interaction, but do not result in learning unless the learner then makes an effort to remember the language to which s/he has been exposed. When considering language learning strategies, it is important to remember that strategies are only one of the variables involved. Learners are different from each other, and no single strategy will work for every learner. Furthermore, the same strategies may not work equally effectively in every situation – strategies are very context dependent. Neither will they always work for every learning target – a General English student may well need to adjust strategies if he or she changes to study for an exam such as TOEFL or IELTS. In other words, strategies are not good or bad in themselves, but we can say that a strategy is effective if it works for a given learner in a given context working for a given target.

2. **Strategy instruction**

The history of strategy instruction has by no means been entirely successful. Wenden (1987), for instance, describes a programme where less than 50% of the students thought strategy training had been useful. Griffiths (2013) reports a similar negative reaction to a strategy training class which resulted in the class being discontinued. In the face of such negative results, Rees-Miller (1993) recommends that the time spent teaching strategies is better spent teaching the subject. Other researchers, however, such as Chamot and O’Malley (1986), Cohen (1998), Macaro (2001), Nakatani (2005) and Vandergrift and Tafaghodatan (2010) have produced more positive results which seem to suggest that well-planned and executed strategy instruction programs can be worthwhile.

Rubin (1987) suggests that an important element of strategy instruction is the raising of students’ awareness of language learning strategy options. If students know the alternatives they have available they are in a better position to make informed choices. According to Oxford (1989), practice is an important ingredient of strategy training. If the new strategies of which students have been made aware are rehearsed, they will become automatic and stored in a student’s individual strategy repertoire to be called on as needed. Wenden (1991) suggests that strategy training needs to be explicit. If students do not clearly understand what they are doing and why, they will not transfer the new strategies they have learnt beyond the immediate task to new ones. In addition to explicit instruction, Cohen (1998) argues that strategy instruction should also be implicit. That is, strategy instruction needs to be embedded into regular classroom activities in such a way that it is not seen as just a waste of time and a distraction from the real task of learning new language.

3. **Conclusion**

It would seem that effective language learning strategy instruction should aim to raise learner awareness of strategy choices and provide opportunities to practice by means of both explicit and implicit instruction. And all of these dimensions need to be planned into a strategy instruction program if it is to be effective, Although much research remains to be done to determine the best ways of doing this.

**References**


**Short professional profile of the speakers:**

**Carol Griffiths – Associate Professor of Applied Linguistics, Fatih University, Istanbul.** Dr Carol Griffiths has been a teacher, manager and teacher trainer of ELT for many years. She has taught in many places around the world, including New Zealand, Indonesia, Japan, China, North Korea and UK. She has presented at numerous conferences and published widely, including her books “Lessons from Good Language Learners” and “The Strategy Factor in Successful Language Learning”.

**Birsen Tütünis – Professor of ELT at Kültür University, Istanbul, Turkey,** received her PhD from the University of Sussex. She has been working as an English instructor, lecturer and administrator for many years, and has written articles and books on different issues. She is the coordinator of Teacher Training and Education Committee (TTEd SIG) of IATEFL, and has been the key note speaker and given presentations at different international ELT Conferences. She is on the editorial board of the “ELT Research Journal”, and she is an Honorary Member of AzETA in Azerbaijan.
Grammatical competence was established by Hymes (1972) as an essential component of communicative competence. In order to assess grammatical competence, a commonly employed technique is to examine students’ errors, since errors can be taken as an indicator of progress in language development (Corder, 1967). Therefore, with the aim of investigating error rates and types of grammatical errors, the written work of 30 freshman students in the English Language Teaching Department at a Turkish university were analysed. The students were divided into two groups (each of 15 students) with one group at a higher level than the other according to the results of their proficiency exam. The students’ written work was marked and the grammar errors noted. An analysis of the errors revealed the following error types: plurality, articles, subject-verb agreement, word order, pronouns, prepositions, part of speech, auxiliaries, negation, tense agreement and lexis. An interesting finding was that, although the higher level students made fewer errors overall, their error rate for some types of errors was actually higher than for the lower level students. Possible reasons for this finding, as well as the overall results, are suggested, implications for the teaching and learning situation and for the development of grammatical competence are discussed and suggestions are made for ongoing research.

1. Introduction

This study reports on the findings of a small scale study carried out at a Turkish university. Students’ written work was marked for grammatical errors and the results analysed for error frequency and type according to student level.

There have been a number of studies which have investigated the linguistic areas where foreign language learners have difficulty while trying to write effectively in English. For instance, [1], during an investigation into the written grammatical errors of Arabic students of English as a foreign language at a university in Jordan, discovered that the category that included the largest number of errors was related to the use of prepositions. The next most problematic areas were morphological errors, articles, verbs, use of active/passive and tenses. Another study conducted by [4] focused on the grammatical errors made in their compositions by fourth semester students of the English Department of a university in Jakarta. The students’ writings were examined to determine the morphological and syntactical errors. The results of the study revealed that the largest error category related to noun phrases. The second major type of error related to verb phrases. These were followed by word-order and verb construction errors. In order to identify the types of errors and their frequency of occurrence in the written papers of students, [3] examined the written work of English Language department students who were in the fourth year of their university education in Indonesia. The data came from seventeen proposals for linguistics projects, which were the final projects required for the students to complete their undergraduate studies. The findings indicated that morphological and syntactic errors were the two main categories of errors.
2. **Methodology**

The study examined errors in students' written work and sought to answer the following research questions:

- What are the grammar errors that EFL students make in their writing?
- Do lower level students make more grammatical errors than higher level students?
- Do the types of grammatical errors change according to level?

### 2.1. Research setting

The current research took place at a private English medium university in Istanbul, Turkey. On entering the university, students are given an English proficiency exam to determine their placement. The exam includes the four skills (reading, writing, speaking and listening) and is marked out of 120. Students who get 70 out of 120 are able to enter their courses directly. If they get less than 70 they are placed in a preparatory programme.

### 2.2. Participants

30 freshman students at the English Language Teaching Department participated in the study at the beginning of the second semester. The ages of the students were between 17 and 20 and they were all native speakers of Turkish.

### 2.3. Data collection and analysis

The participating students were asked to write an essay on a selected topic. The written work was marked by the teacher (the first author of this article) and subsequently re-marked by the second author, producing an inter-rater reliability of 94%. Following discussion to resolve marking disparities, the grammar errors were listed and then classified according to whether they involved plurality, articles, subject-verb agreement, word order, pronouns, prepositions, part of speech, auxiliaries, negation, tense agreement or lexis. The numbers of these errors were counted, both overall and according to the higher or lower groupings, and averages and differences were calculated.

3. **Results**

According to a descriptive statistical analysis, the overall average error rate across all 30 students was 3.1. For the lower level group, the average error rate was 3.5, and for the higher group it was 2.8. By far the most common type of error overall was related to **parts of speech**. The next most common error type related to **plurality**, and this was followed by **subject-verb agreement** and **prepositional use**, while **article usage** accounted for 10 errors over both the higher and lower groups. At the other end of the frequency scale, negation accounts for only one error, while pronoun misuse and problems with tense agreement also contributed minimally to the overall error rate.

If we consider the errors according to student level, members of the lower group did on average make more errors than members of the higher group. However, although the higher level students' error rate was lower on average than the lower students' rate, it was, perhaps, surprising to find that some error types featured more frequently in the higher level students' work. This is particularly noticeable with **parts of speech**. This rather unexpected finding might possibly be explained by the fact that the higher level students are attempting to use more difficult grammatical structures in their writing.

In terms of pedagogical implications, these findings might suggest that students should not be penalized too heavily for errors, since this may well discourage experimentation and student initiative. More research is needed into the questions posed by this study, especially in a variety of contexts.
References


Short professional profile of the speaker:

Carol Griffiths – Associate Professor of Applied Linguistics, Fatih University, Istanbul. Dr Carol Griffiths has been a teacher, manager and teacher trainer of ELT for many years. She has taught in many places around the world, including New Zealand, Indonesia, Japan, China, North Korea and UK. She has presented at numerous conferences and published widely, including her books “Lessons from Good Language Learners” and “The Strategy Factor in Successful Language Learning”.

Görsev İnceçay – Instructor at School of Foreign Languages at Yeditepe University and PhD Candidate in the field of ELT. She is a 14 year experienced instructor who has worked in both private and state institutions. She has published articles in international journals and attended international conferences. Her main interests are teacher education, affective factors in EFL and ELF.
The aim of the paper is to show the application of teaching methods used in the teaching process in teaching the content area of biological sciences or biochemistry, as well as their empirical confirmation by measuring the achievements of the student. Intentional causes for this paper to be written can be found in the fact that in our teaching practice empirical studies that aim to entrust successful application of contemporary models of learning and teaching are extremely rare, which is especially the case in teaching the area of natural sciences, or, more precisely, biology. Institutions of higher education and training within the European Union offer their own proposals for the modernization of the educational process in our schools, but only as examples and ideas that need to be upgraded to suit the conditions of our teaching practice. Models of learning and instruction for teaching biology that will be proposed in this paper rely on the achievements of teaching practice and compatible teaching subject in the countries of the European Union under the title “Science” and “Primary science”.

The purpose of this paper is to determine the effects of usage of sequential teaching method on the academic achievement and retention level of students. Three student groups of biology students in University “Goce Delcev”, Faculty of Natural and Technical Sciences, Institute of Biology, – Stip, R. Macedonia were offered a topic on general characteristics of Proteins: Their Biological Functions and Primary Structure with different sequences of 3 teaching methods. The teaching methods were Laboratory method (student experiment), slide demonstration and lecture method.

Key words: teaching methods, laboratory method, slide demonstration, lecture method, academic achievement, retention level, biological sciences

Introduction

In terms of traditional teaching dominated by the teacher, verbal methods, students’ mechanical memorizing, as well as by methods, students - future teachers of biology must prepare and become practically enabled for something quite different. According to Matijevic, gone are the days when the developmental and educational tasks could be pursued by teachers “craftsmen” reproducing the work models they experienced in their education – it is time for the training teachers who are able to create new and original pedagogical situations (Matijevic, 2007).

To make students understand the complex system of knowledge about nature and understand the full complexity of social relations in which they will find themselves, it is necessary that they are directed towards the ways and means of discovering the scientific truth as early as in the earliest grades of elementary school. In
biology classes “forms of learning which largely contribute to the development of students’ cognitive ability and engage them during most of the lesson, and raise curiosity and interest in further study of phenomena, processes and relationships that surround them must be nurtured and applied continually”. The emphasis should be on students becoming independent, preparing them for using various sources of knowledge, for connecting the acquired knowledge from different areas, for practical application of knowledge in solving problems in students’ daily lives of students, and for creating (securing) conditions for such diverse and creative participation of students in the teaching process. Modern education insists, therefore, on the active role of students in the teaching process, and the teacher is expected to be qualified “theoretically and empirically, and to choose the most appropriate teaching method from the repertoire of teaching methods” (Vilotijević, 1999).

On the other hand, students - future teachers who will work with the above mentioned students in future are insufficiently trained for the practical application of modern, active teaching methods and innovative models in teaching. Research shows that the education of future teachers significantly places greater emphasis on academic content, while their practical and applicable skills and abilities are neglected. Teaching practice in schools is not an equal and important segment of the overall preparation of students for their future careers, but it is just an annex to their theoretical training. This is a consequence of the mistaken assumption that the knowledge acquired in the academic area is sufficient to successfully perform the teaching profession, i.e. of the opinion that mastering “academic disciplines” in combination with “a talent for teaching” is a sufficient prerequisite for the qualitative performance of the teaching profession.

One of the most prominent strategic objectives of the reform of educational systems in Europe over the last decade, “is the establishment of a comprehensive system of (self) evaluation, monitoring and assessment of practical training - an experiment that, as an integral part of the educational system, would provide quality of educational conditions, educational processes and outcomes in accordance with the standards. According to the same author, the analysis of some of the solutions for practical pedagogical training of students in developed countries and regions indicates that the “practical teaching in higher education is given special attention”, while research carried out in our country points to the problem of lack of quality student practice, namely “insufficient acquisition, monitoring and evaluation of practical knowledge and skills in colleges. Teachers in the pedagogical and didactic theory encounter general guidelines for the innovation of teaching, such as: instruction should not be conceived as memorizing facts and concepts, definitions and phenomena, individual differences among students should be respected, student should be brought into a situation to develop their knowledge, etc. But such demands do not trigger response if not observed and re-shaped into precise and specific methodological guidelines aimed at current programme content. The introduction of innovation will be facilitated by providing complete didactic materials which will help teachers to apply these innovations in practice more easily. The use of modern instructional technology does not mean only modernization of the school with new and modern teaching aids, but providing clear guidelines for implementation of the active forms and methods in the context of current educational contents. The teacher must know how to combine modern methods, forms and advantages of teaching, or what the advantages and disadvantages of such models and frameworks are, and in what frames they can be successfully applied in our teaching practice.

In an attempt to avoid generalized didactics and out of the desire to leave using teaching methods, which can easily be transformed into routine practice and bare practicing, the basic idea of the work was to show how to shape innovative models of educational organization in teaching biology, i.e. the kind of effect they have on the success of students, or what dimensions the teacher has to take into account in order to meet the frames of contemporary teaching of biology.

Modern methodological and didactic theory needs experimental verification of the application of teaching methods in teaching organization for setting clear signposts of teaching practice.

The acceptance of innovation and improvement of competencies must be the foundation of the professional development of teachers, particularly in the areas of effective instruction and management in the classroom, for the development of the desired pupils’ competencies for a life in the contemporary environment, as well as in the goal of getting to an effective teaching and contemporary forms of learning in practice. Biology teaching must reflect the exciting nature of the subject and its surroundings. Student work in biology lessons
should be practical and visual in nature wherever possible. In actual fact, teachers often use only lecture
method (without visual aids or demonstrations) in biology lesson in general. There has been a number of re-
searches on the effectiveness of different teaching methods in biology lessons (Galton and Eggleston 1979;
Holstein and Lunetta 1982; Johnson 1991; Odubunmi and Balogun, 1991; Killermann, 1998), and especially
methods of laboratory and slide demonstration are considered to be very effective in biology teaching. But,
these methods must be used in an appropriate sequence. The Methods used in this study will be explained
briefly.

**Theoretical frame of the research theoretical foundation of the modern
teaching of biology**

Analyzing certain theoretical positions we just wanted to find a foundation for shaping the innovative models
that will be subject to empirical verification, i.e. to detect which teaching methods applied in teaching biology
will increase the success of students studying biology, or which will increase the ability to apply the knowl-
edge students acquired?

Today there are many modern theories of learning, as well as modern theories of teaching. They generally
include cognitive styles and strategies, multi-intelligence, critical and creative thinking, role of motivation in
learning, cooperative learning, interactive learning, and ambient learning. New circumstances create new
learning that is more student-active, self-conscious, creative, and autonomous.

We basically start from the systematic - theoretical didactics that applies the methods and procedures of sys-
tem theory, especially systematic thinking in order to solve problems in a scientific, technical and ideological
field. Due to the fact that the purpose of the system theory is to analyze complex systems and prepare tech-
nical measures for their effective action, teaching biology here is regarded as a complex system consisting of
a series of complex teaching situations. One of the objectives of this research is to discover the elements of
teaching situations, then to detect the relations between them, to investigate the criteria under which they act
and to lead them to raising the level of students' success. For system -theoretical didactics it does not matter
which method will be applied, but the situation for learning is important and it is important which operations
a student must perform (observe, learn, to remember).

Contemporary educational and teaching practice in the application of teaching methods for learning finds its
asylum in those theories of learning which are putting the focus on the activities of the student, the impor-
tance of the discovery, experience and events happening during the process of learning.

In the course of the research three methods are used in teaching biochemistry - teaching unit - Proteins:
Their Biological Functions and primary structure:

- Lecture method,
- Slide demonstrations and
- Laboratory method

**Research hypotheses**

The **basic hypothesis** is: Students generally have a positive attitude towards the application of the labora-
tory method in teaching biochemistry, but they do not neglect the importance of other methods (oral lectures
and demonstration with slides) as well that are applied during lessons in Biochemistry.

**Auxiliary hypotheses we started from in our study are as follows:**

- We assume that the students’ opinions about lessons in Biochemistry they attended the previous
  semester are mostly positive;
- We expect students to positively evaluate their practical competence in planning teaching Biochem-
  istry;
• We assume that students’ attitudes in terms of their practical training in teaching Biochemistry (determination of operational goals and tasks, appropriate choice of teaching methods, forms of work, teaching resources, literature) are mostly positive;
• We assume that a certain number of students believe that they are not adequately or sufficiently trained for the implementation of some innovative models (programmed, exemplary, problem teaching and different levels of complexity teaching) in teaching Biochemistry.

Research methods and instruments

The study used a descriptive-analytical method. The techniques used were questionnaire and scaling. The research instrument is questionnaire, i.e. a five-point Likert-type scale of responses constructed by the author according to the defined research tasks. The instrument used did not pass a complex methodological procedure check of exactness and its psychometric properties. It is designed to enable us to gather empirical data necessary to improve certain areas of practical training of students in the field of Biology, i.e. Biochemistry. Through their answers to the questions students should express their views and opinions of their practical training in the implementation of various segments of teaching Biochemistry. The views are grouped by certain segments important for students’ professional practical training. Students answer the questions by circling one of the offered responses on the five-point scale - strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4) strongly agree (5). Objectivity is provided by the fact that they filled out the questionnaire anonymously. The survey results were statistically analyzed using the software package SPSS statistics - version 17.

Research sample

The study included 15 full-time students in their second year of study at the Faculty of Natural and Technical Sciences, studies major in biology at the University “Goce Delčev” Stip, R. Macedonia. This is the generation enrolled in the academic year 2011/12 with the curriculum reformed in line with the Bologna Declaration. The sample was deliberate, because the collection of relevant data should be done by examining the students who attended the course in Biochemistry.

Based on the fact that the teaching of Biochemistry is organized with the aim of better and more efficient professional training of our students, we considered it important that the students themselves assess their practical skills and express their opinions about their professional competence. The results should serve as a basis for modernizing, improving and correcting certain segments of the students’ practical training for the realization of teaching Biochemistry in the sophomore year in college.

Lecture method

Lecturing remains one of the more popular methods to transmit information and ideas by teachers, trainers and speakers. As students and audience participants we are quite familiar with the approach. Lectures can be informative, boring and overwhelming depending on the compelling nature of the message and the presenter’s style and clarity of message. The lecture method usually is one-way communication and allows for little or none audience participation. The result is audience misunderstanding, loss of information and poor retention.

The traditional didactic lecture method as “an oral presentation given to a class by the teacher” (p. 31), while stated that the lecture or didactic is the method of teaching outside of manipulative work. Teachers are comfortable with the traditional method because they remain in control of content and time (Havice, 1999).

Evidences from a number of disciplines suggest that oral presentation to a large group of passive students contributes very little to real learning. In physics, standard oral-lecture does not help most students develop conceptual understanding of fundamental processes in electricity and in mechanics. Similarly, student grades in a large general chemistry oral lecture course do not correlate with the lecturing skills and experience of the instructor.
Despite the limitations of traditional oral-lectures, introductory courses in biology are forced to offer high-enrolment introductory science courses. Many professors who teach these courses feel that lecturing is their only option, and can only dream of what they could accomplish in smaller classes. However, there is a small but growing group of science faculty members who have developed ways to engage students in the process of thinking, questioning, and problem solving despite the large class size.

It is important to remember that the single overriding goal of a presentation is to provide meaningful content in an entertaining way so that participants focus their attention, understand material and are receptive to implementing new ideas back home. The whole preparation, presentation and content of a lecture must therefore be directed not to the speaker but to the audience needs and wants. I encourage you to try some of the techniques provided so that your lectures may be perceived as more interactive, understood, and remembered.

**Slide demonstrations**

A slide demonstration is an act that a teacher shows and explains something to a class by a prepared PPT teaching tool in Microsoft office software or classically via overhead. This can be used as any educational materials.

Carefully material-selected slide demonstrations are one of the ways of helping students overcome misconceptions, and there are a variety of resources available (Katz, 1991). Slide demonstrations can be very effective for illustrating concepts in the class, but can result in passive learning without careful attention to engaging students. They can provoke students to think by themselves and are especially helpful if the slide demonstration has a surprise, challenges an assumption, or illustrates an otherwise abstract concept or mechanism. Slide demonstrations that use everyday objects are especially effective and require little preparation on the part of faculty. Students' interest is peaked if they are asked to make predictions and vote on the most probable outcome. There are numerous resources available to help faculty design and conduct slide demonstrations.

**Laboratory method (student experiment)**

Laboratory work is the hallmark of education in science and technology based fields. Student laboratories are a costly resource yet their educational potential is often not fully realized in practice. It is timely that their design and delivery and the forms of student assessment used be examined critically for their contribution to high quality learning (Winter et al., 2001).

The first area of study is the effectiveness of laboratory activities for promoting learning. Practical work is a central theme of lessons in the natural sciences (Galton and Eggleston, 1979; Holstein and Lunetta, 1982). Laboratory work is seen as an integral part of most science courses and offers students a learning environment that differs in many ways from the “traditional” classroom setting (Fisher et al., 1998).

It is important to consider whether learning is more effective if the students do the student experiments themselves or they watch the teacher demonstrating the student experiments. Furthermore, are either of these approaches more effective than the teacher simply describing the student experiments to the students and telling them the results? (Killermann, 1998).

It is hard to imagine learning about science, without doing laboratory or fieldwork. Student experimentation underlies all scientific knowledge and understanding. They provide students with opportunities to think about, discuss, and solve real problems. No science can be properly taught without student experiments. The student experiment should be the central part of science teaching. It serves many purposes. Student experiments are performed to find relations among concepts or to verify hypothesis. As in other lessons, in science lessons the effectiveness is related to the use of teaching methods. Some methods may use together for offering a topic. But, which method must take precedence to increase student academic achievement and retention level?
The aim of this study was to determine the effects of the usage sequential lecture method such as didactic lecture, slide demonstration and laboratory student experiment on the academic achievement and retention (remembrance) level in teaching of enzymes.

Academic achievement: Achievement meant that students have possessed immediately after finishing the lesson.

Retention (remembrance) level: Achievement meant that students' retain (remembrance) which is determined 40 days after finishing the lesson.

Research problem
How does the usage of sequence of teaching methods in science education effect the academic achievement and retention (remembrance)?

Sub problems of research
1. Are there any differences in academic achievement among the groups examined? (Group I-Group II, Group I-Group III, Group II-Group III).
2. Are there any differences in retention (remembrance) levels among the groups examined? (Group I-Group II, Group I-Group III, Group II-Group III).

Methodology Sample
This study was designed as experimental and carried out with three student groups, each of which included 15 biology students in first year The University “Goce Delčev”, Faculty of Natural and Technical Sciences, Institute of Biology.

Data Gathering Tools
The work was attempted to establish empirically whether the usage of sequential teaching methods was important for academic achievement and retention. The efficiency was determined quantitatively by a written test. This test contained 25 questions. This test was used as pre-, and post-test before and after methods' applications, and then retention test after 40 days from completing the study.

Procedure and Data Analysis
At first, a pre-test is administered to three groups that each one had 20 students. According to pre-test's results, differences among groups were analysed statistically by using one way ANOVA test (Table I), and there was no significant difference (P>0.05) among them.

METHODOLOGICAL FRAMES OF THE RESEARCH – Research problem
How does the usage of sequence of teaching methods in science education effect the academic achievement and retention?

Sub problems of research
1. Are there any differences in academic achievement among the groups examined? (Group I-Group II, Group I-Group III, Group II-Group III).
2. Are there any differences in retention (remembrance) levels among the groups examined? (Group I-Group II, Group I-Group III, Group II-Group III).

Methodology Sample
This study was designed as experimental and carried out with three student groups, each of which included 15 biology students in first year The University “Goce Delčev”, Faculty of Natural and Technical Sciences, Institute of Biology.
**Data Gathering Tools**

The work was attempted to establish empirically whether the usage of sequential teaching methods was important for academic achievement and retention. The efficiency was determined quantitatively by a written test. This test contained 20 questions (added in Appendix) were selected from University entrance exams by the authors. This test was used as pre-, and post-test before and after methods’ applications, and then retention test after 30 days from completing the study.

**Procedure and Data Analysis**

At first, a pre-test is administered to three groups that each one had 20 students. According to pre-test’s results, differences among groups were analysed statistically by using one way ANOVA test (Table I), and there was no significant difference (P>0.05) among them.

Table I. one way - ANOVA test results of pre-test of groups

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<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>Group II</td>
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<td>1.51</td>
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<tr>
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<td>Between Groups</td>
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</tr>
<tr>
<td>Within Groups</td>
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<td>Total</td>
<td>40.13</td>
<td>63</td>
</tr>
</tbody>
</table>

Then, the general concepts and main knowledge of enzymes were taught using three methods in different sequences. The first group started with experiments in the laboratory, then the relevant theory of enzyme was given lecture method, and then the slides were shown by teacher. The sequence of these three teaching methods used in the first group was changed in the second group. In the second group, lesson was started with lecture methods, then used slide show and the latest experiment was done. The sequence of these teaching methods was also changed and the use of the slide show was initiated, then the experiment was done and the latest lecture method was used in third group.

The sequences of teaching methods for the three groups were as follows:

- Group I: Student experiment – lecture method – slide demonstration.
- Group II: Lecture method – slide demonstration – student experiment.

The student experiment’s aim was to provide a simple experiment to prove the proteins, reaction which can be easily managed in class. In this experiment, students proved the peptide bones formed among amino acids in the proteins. In 1st tube they put urea crystals which need to be heated, the way biuret is formed. In the second tube 2ml egg solution is put and in the third tube 2 ml gelatine. In all three tubes, 1ml NaOH and 2-3 drops Cu (SO) 4 is put, violet complex compound is formed in all three tubes, which shows positive biuretic reaction, which prives the proteins. In lecture method, a lecture presented orally on the general knowledge of proteins without using any kind of media.

In slide demonstration, lecture was performed by showing slides that was containing the explanation of characteristics, structure and study principles of proteins. Each teaching approach lasted in two hours. Then, the same measure tool (pre-test) was applied to each group as post-test. Thirty days after the lesson, it was repeated to each group as retention test. “Delayed retention tests” are research instruments which are administered two or more weeks after instruction and initial testing to measure retained knowledge (Haynie, 1997). Pupils never were aware of any further testing and these tests were not used for grading purpose to avoid the influence of extrinsic variables. Results were evaluated by using one way ANOVA test.
Results

Table II. Comparisons among groups in point of post-test.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>5</td>
<td>5.90</td>
<td>1.65</td>
</tr>
<tr>
<td>Group II</td>
<td>5</td>
<td>3.90</td>
<td>1.82</td>
</tr>
<tr>
<td>Group III</td>
<td>5</td>
<td>2.10</td>
<td>1.64</td>
</tr>
</tbody>
</table>

Sum of squares | df | Mean square |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>21.25</td>
<td>3</td>
</tr>
<tr>
<td>Within Groups</td>
<td>69.90</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>74.92</td>
<td>26</td>
</tr>
</tbody>
</table>

In Table II, according to one-way ANOVA test results, difference between Group I and Group II was statistically significant (P<0.05). This result suggested that, students' academic achievement level in Group I was higher than Group II students. This one-way ANOVA test results established that the difference among the groups' average was significant (P<0.05). This meant that, students' academic achievement level in Group III was higher than that of Group II.

Table III. Comparisons among groups in point of view retention level

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>5</td>
<td>51.32</td>
<td>1.89</td>
</tr>
<tr>
<td>Group II</td>
<td>5</td>
<td>3.92</td>
<td>1.72</td>
</tr>
<tr>
<td>Group III</td>
<td>5</td>
<td>51.34</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Sum of squares | df | Mean square |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>8.25</td>
<td>3</td>
</tr>
<tr>
<td>Within Groups</td>
<td>65.12</td>
<td>6.05</td>
</tr>
<tr>
<td>Total</td>
<td>56.34</td>
<td>4.82</td>
</tr>
</tbody>
</table>

As seen in Table III, the difference between Group I and Group II was significant (P<0.05). It meant that students' retention (remembrance) level in Group I was higher than Group II.

Discussion and Conclusion

The results of this study showed that academic achievement in lessons began with experiment or slide demonstration was higher than lesson beginning with lecture method. In science teaching, using laboratory student experiment or slide demonstration at the beginning of the lesson attracts attention and motivation of students. But, using oral-only lecture bores students and loses their attention to it.

A laboratory setting is a more conducive learning environment than lecture halls (especially for large classes) as it provides students with real life situations and a chance to exercise their problem-solving skills. At the same time, students have more time and opportunities for hands-on experience, active thinking and knowledge reflection. In addition, a teamwork environment encourages students to practice their interper-
personal skills as well as to nurture team spirit and leadership. Finally, oral presentations provide an opportunity for students to sharpen their mental response and presentation skills.

According to this study’s results, retention (remembrance) level in lesson beginning with experiment and slide demonstration was higher than that of beginning with lecture. Because, people remembrance 10% of what they read, 20% of what they heard, 30% of what they saw and 90% of what they had a hands-on experience. Laboratory work is a hands-on experience.

This study has also showed that student comprehension can be enhanced with lesson started with experiment, because these activities increase students’ interest in the topics. It is hoped that this study would be a beginning on different teaching methods in biology in Macedonia. Furthermore, the results of the present study could be adapted to any other teaching cases. In as much as teaching method appears to make a difference in student achievement, which method is most effective varies within and across schools and subject matter areas. There was no “best” teaching method across groups of students or different subject matter. The individual teachers are in the best position to determine the most effective teaching method for their particular group of students and their unique subject matter. This finding may even extend to groups of students within classes and change from one subject to the next. This makes a case for the use of a wide variety of methods in teaching all subjects. Further research is recommended to extend this study by including more schools, more classrooms, different agriscience classes, and different subject matter to determine if these results are generalizable. The length of any future study should be extended to an entire unit of instruction or even to a semester to determine if long-term use of lecture or experiential teaching method indicates an advantage to either method.

References


