TECRINO

www.tecrino-project.eu

Content

We are glad to have the opportunity to work together on a project that fosters innovation and creativity. It is now widely accepted that the ability to innovate and creativity in problem solving are key objectives of the education in a knowledge based society. Unlike the vast majority of other projects dedicated to Lifelong education, the TECRINO project attempts not just to develop new skills and competences in the audience, but to produce a major change in the way of thinking about problem solving.

For two years our team of eight partners from Cyprus, Spain, Poland, Portugal, Romania and Croatia shall work on e-learning platform which will help both teachers and students to gain new insights on creativity as a process and skills that can be thought. This is our first newsletter, in which we shall give you an overview of some of our so far project activities and activities ahead, as well as about the events, similar projects and success stories on innovation and creativity.
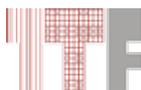
Dr Antri Theodorou, Project Coordinator, RTD Talos Ltd, Cyprus
at@talos-rtd.com

RTD Talos Ltd (project coordinator)
Cyprus
www.talos-rtd.com

University of Zagreb, Faculty of textile-technology
Croatia
www.ttf.unizg.hr

University "Dunarea de Jos" of Galati – UDJG
Romania
www.ugal.ro

Syntea S.A.
Poland
www.syntea.pl

EPRALIMA - Escola Profissional do Alto Lima C.I.P.R.L.
Portugal
www.epralima.com

Inercia Digital S.L.
Spain
www.inerciadigital.com

Fondo Formación Euskadi
Spain
www.ffeuskadi.net

HAMAG- BICRO
Croatian Agency for SMEs and Investments
Croatia
www.hamag.hr

1. TECRINO – Teaching creativity in engineering
The project overview

TECRINO – Teaching creativity in engineering, is the project within framework of Life Long Learning Programme – Leonardo da Vinci, GRUNDTVIG AND DISSEMINATION (2007-2013), (*here*) focused on creativity and innovation which are the main assets for the business competitiveness in the modern economies.

There are eight project partners: RTD Talos Ltd from **Cyprus** ; University of Zagreb, Faculty of Textile-technology and HAMAG-BICRO from **Croatia**; Dunarea de Jos" University of Galati - UDJG from **Romania**; Syntea S.A. from **Poland**; Epralima Vocational Training School from **Portugal** and Inercia Digital S.L. and Fondo Formación Euskadi from **Spain**.

The rationale behind TECRINO is that creativity is a skill which can be learned and that creative person is more inventive. Still, formal educational systems in the most EU countries are lacking in training materials that foster innovation and creativeness. Another challenge is a lack of awareness of the importance of the informal ways of teaching and learning creativeness.

Following those premises, TECRINO's *main objective* is to develop educational resources designed to foster creativity of both students and teachers involved in VET and make this content compatible with the existing open source learning management systems like Moodle. TECRINO aims to become a reference system at EU level to improve the promotion of the innovation and creativity in VET systems.

Diagram 1: TECRINO project activities

The materials will comprise of two groups:

 - A group of modular training itineraries to qualify the group in the valorisation, development and mobilisation of competences linked to INNOVATION learnt in informal context
 - A group of didactic guides in CD Rom format in two versions for trainers and trainees to valorise, develop and mobilise the competences linked to innovation learnt in informal context

In designing and creation those materials we shall take into account the most widely used techniques and tools for stimulating the creative thinking such as **brainstorming, SCAMPER, attribute listing, lateral thinking, serendipity, TRIZ , mind mapping, creative games** etc.

Our **target groups** are both trainers and students, among who are: adult trainers and Guides, adult training centres, Foundations and NGOs promoting lifelong learning, schools etc.

Over two years, from January 2014 until January 2016, TECRINO partners will design and implement innovative and effective training materials and methodologies aimed to enhance the awareness and develop competences for innovation of both tutors and students. Our final product will be an e-learning material accessible online which will allow promotion of innovation and creative solutions of problems in VET environment.

The background for the TECRINO's creativity and innovative e-learning platform is well described in the white paper *Beyond the fast-food model of education. Is the school capable to foster creativity?*, written by Ioan Susnea, Grigore Vasiliu and Simona Spiridon from the University "Dunarea de Jos" of Galati in Romania, which is a partner on the TECRINO.

The paper was presented at the International Conference of Scientific Paper AFASES 2014, held in Brasov from22-24 May 2014. It can be uploaded *here*

2. Edward de Bono: Creativity vs innovation

- Innovation itself does not imply creativity
- Excellent but it's not enough

Maltese physician, an expert on human brain and father of lateral thinking , Edward De Bono (*here*) has written 70 books on creativity, inventiveness and thinking. De Bono coined term lateral thinking, created techniques *Six Thinking Hats* and the *Direct Attention Thinking Tools.*
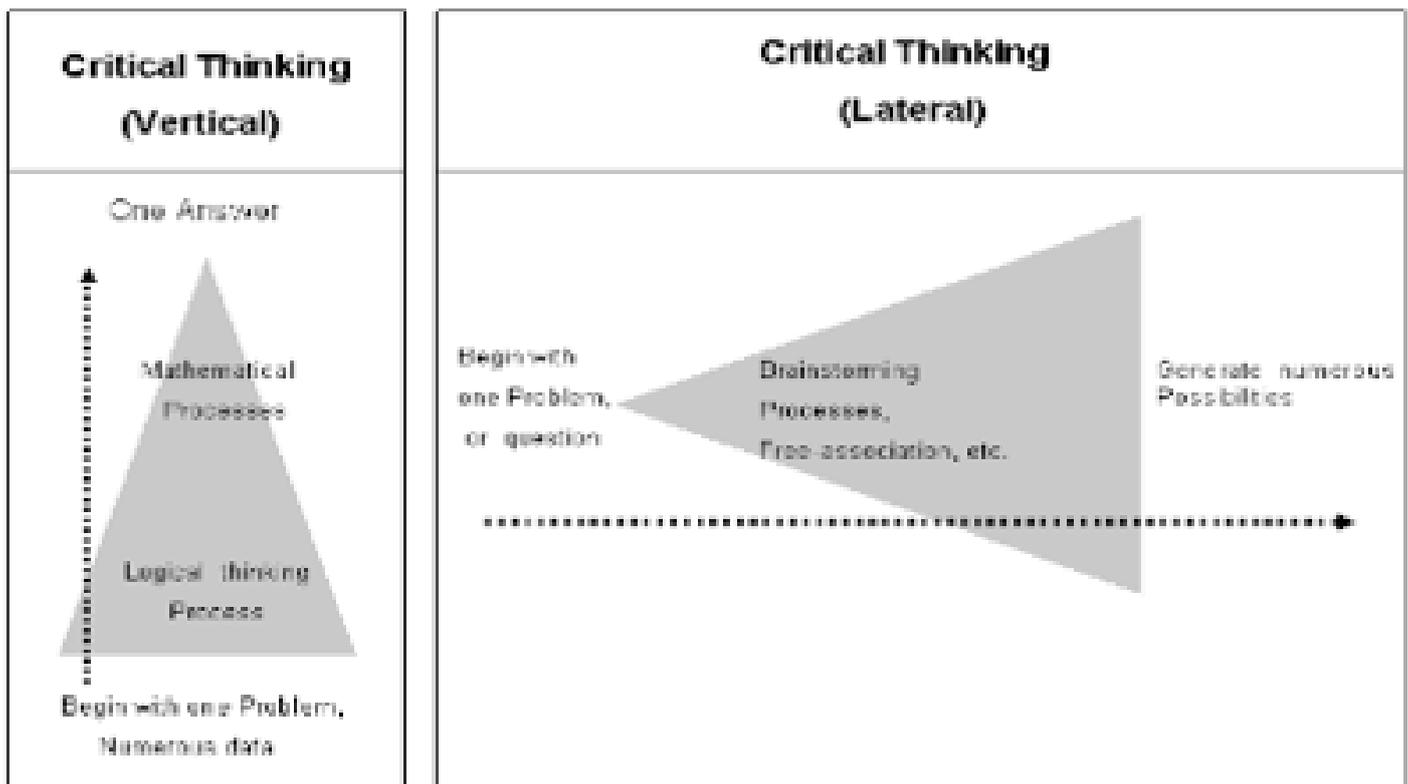

Critical Thinking (Vertical)
One Answer
Mathematical Processes
Logical thinking Process
Begin with one Problem, Numerous data

Critical Thinking (Lateral)
Begin with one Problem, or question
Brainstorming Processes, Free association, etc.
Generate numerous Possibilities

Diagram 2: Critical thinking vs lateral thinking

Vertical thinking uses the processes of logic, i.e. the traditional, historical method of thinking established by the Greek Gang of Three: Socrates, Plato and Aristotle.
Lateral thinking involves disrupting an apparent thinking sequence and arriving at the solution from another angle. It gives us the gift of creativity.

He has been working for decades as a consultant for corporations, governments, and individuals world-wide, including IBM, Prudential, GM, BT (UK), NTT (Japan), Nokia (Finland), Mondadori (Italy), Total (France), Siemens (Germany), Bosch (Germany), Ericsson (Sweden) and many others.

De Bono is proponent of introducing teaching of the art of thinking at schools. His methods are now mandatory in the school curriculum in many countries and widely used in others.

He was one of the 27 Ambassadors for the European Year of Creativity and Innovation 2009 and in the same year he was proposed for the Nobel prize in economy.

Edward de Bono was chosen by a group of academics as one of the 250 people who had contributed most to humanity in the whole history of the human race.
Currently, he is the chairman of the Council of Young Enterprise Europe, which has a membership of million and half youngsters across Europe, Israel and Russia, who set up mini-businesses while at school. (*here*)

Although innovation and creativity in the past decade have come buzz words, still it is quite often mixed up. Innovation itself does not imply creativity. How it is different and what do they mean in the business environment. According to de Bono's experience, the business sector is the most interested in a good way of thinking because a new way of thinning in business can be very easily and immediately tested.

We chose two interviews with Dr de Bono on innovation and creativity:

1. Innovation does not imply creativity
   here

2. The danger in our logic thinking culture is that we do not have expression 'excellent, but not enough, *here*

3. TRIZ methodology

Somebody someplace has already solved this problem (or one very similar to it)

In the past decade very few methods on creativity and inventiveness got so widely spread and embraced among the corporate and academic communities as it was the TRIZ - Theory of Inventive Problem Solving. TRIZ was created and developed in Soviet Union between 1946 and 1985 by Russian inventor and SF writer Genrich Saulovich Altshuller and his colleagues. Until the collapse of Soviet Union it was hardly heard of on the West. But since 1991 until 2002, the interests and implementation of the TRIZ worldwide has progressively raised due to migration of the TRIZ experts from Russia to USA , where they set up own businesses and started to promote TRIZ as the method which successfully solves engineering challenges.
One of the very first companies was Ideation International, founded in 1992 in USA by Zlotin and Zusmana. They adapted TRIZ for American users, primarily for engineers and educated and trained hundreds of professionals in engineering.
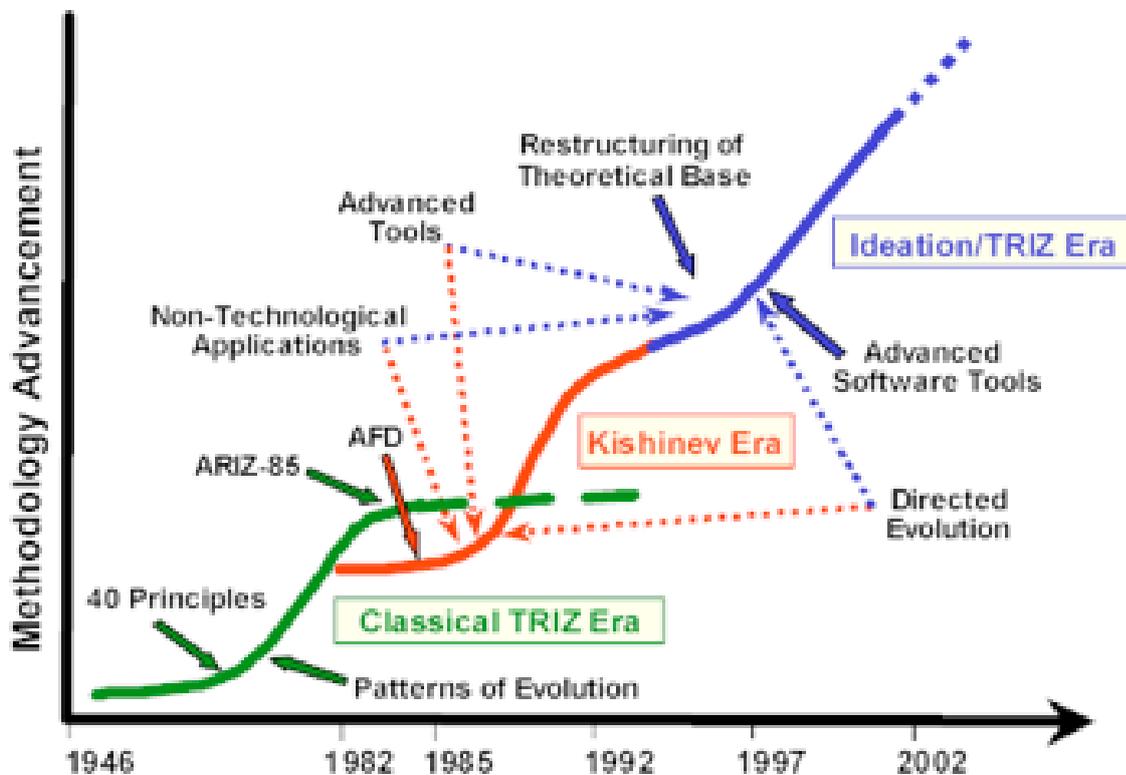

Diagram 3: TRIZ evolution (*source http://www.ideationtriz.com/*)

These days, TRIZ legacy includes millions of users, TRIZ journal (*here*) and numerous clubs.

In the corporate domain, it is used across several parallel paths: in Six Sigma processes, in project management and risk management systems, and in organizational innovation initiatives.

Giving a task from Stalin himself, to find out the way to improve inventiveness and provide a new solution, G. S. Altshuller spent years in libraries, analysing more than 3 million of patents and inventions through the history of humankind. He came up with conclusion that there are universal principles of creativity that are the basis for creative innovations that advance technology. If these principles could be identified and codified, they could be taught to people to make the process of creativity more predictable. In short he summarised that *'Somebody someplace has already solved this problem (or one very similar to it.) Creativity is now finding that solution and adapting it to this particular problem.'*

Based on that premises, G. S. Altshuller developed TRIZ on postulates of repeatability, predictability, and reliability and consequently, to its structured and algorithmic approach.

Thus TRIZ relies on the study of the patterns of problems and solutions, not on the spontaneous and intuitive creativity of individuals or groups.
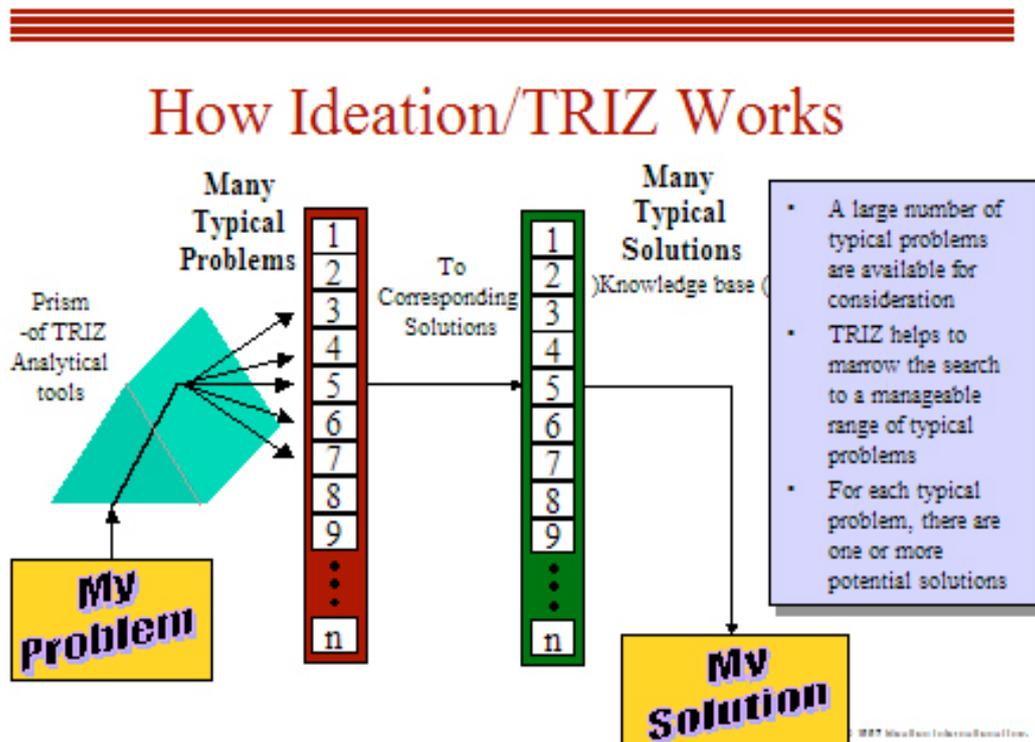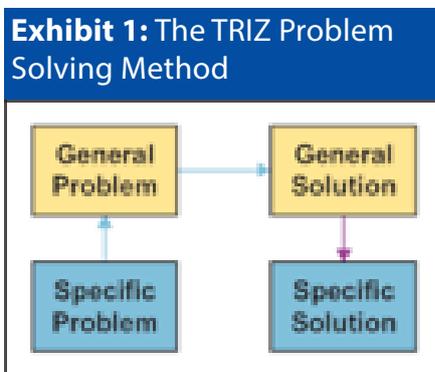

Diagram 4: How TRIZ works (*source http://www.ideationtriz.com*)

TRIZ in practice - examples and resources

In article on TRIZ, Katie Barry, Ellen Domb and Michael S. Slocum provide an example how TRIZ is used in pharmaceutical industry.

Exhibit 1: The TRIZ Problem Solving Method

Following the flow of Exhibit 1, the specific problem is as follows:

Tailored bacteria are used to cultivate human hormones, producing a superior product to those refined from animal sources. To produce the product, very large quantities of tailored bacteria cells are cultured, the cells must be broken open and the cell wall material removed so that the useful hormones can be processed. A mechanical method for breaking the cells had been in use at a moderate scale for some time, but the yield was 80 percent, and was variable. A current crisis was a reduction in yield to 65 percent, and a long-term problem was anticipated in trying to scale production up to high rates, with yield much better than 80 percent.

The TRIZ general problem at the highest level is to find a way to produce the product with no waste, at 100 percent yield, with no added complexity. A TRIZ general solution formula is "The problem should solve itself." One of the patterns of evolution of technology is that energy (fields) replaces objects (mechanical devices). For example, consider using a laser instead of a scalpel for eye surgery. In this case, ultrasound can be used to break the cell walls or using an enzyme to "eat" the cell wall (chemical energy) instead of hitting them. This may seem very general, but it led the pharmaceutical researchers to analyse all the resources available in the problem (the cells, the cell walls, the fluid they are in, the motion of the fluid, the processing facility, etc.) and to conclude that three specific solutions had high potential for their problem:

1. The cell walls should be broken by sound waves (from the pattern of evolution of replacing mechanical means by fields).
2. The cell walls should be broken by shearing, as they pass through the processing facility (using the resources of the existing system in a different way).
3. An enzyme in the fluid should "eat" the cell walls and release the contents at the desired time.

All three methods have been tested successfully. The least expensive, highest yield method was soon put in production. (***here***)

• One of the best resources on TRIZ is project TETRIS (***here)***

• Altshuller in flesh explaining TRIZ can be seen ***here***

4. TECRINO Kick off meeting - Nicosia 21 January 2014

TECRINO kick off meeting was held in Nicosia, Cyprus on the 21t January 2014. That was an opportunity for the project partners to meet each other for the first time and to present their organizations as well as their project activities and roles. The special focus was given for the research project activities on the identification of the existing situation and the needs of the target group.

As a part of the Quality assurance, during the meeting, project partners participated on questionnaire about forthcoming project activities. The questionnaire was divided into two sections:

1. General information about the kick off meeting
2. Contents and methodologies

The Evaluation report of the Kick off meeting was done by Polish partner Synthea SA, the leader of the WP6 dealing with Quality assurance and certification process.

One of the aims of Quality management within the project is the validation and certification of the learning outcomes. This aim will be achieved by introduction to VCC /Vocational Competence Certificate/ standard among the partners and its implementation within the project activities.

Vocational Competence Certification Guidelines was prepared in the beginning of the project implementation in order to assure that development of the training materials will be in line with VCC Institute regulations and that the certification process will be conducted efficiently.

The next project meeting will be held in Bilbao from 17-18 September 2014.

TECRINO project partners at kick off meeting in Nicosia, 21 January 2014

5. Research priorities:
A snapshot of the state of the affairs in VET

One of the TECRINO's very first deliveries was to produce national reports on Analysis of the state of the education for creativity and innovation in project partners' countries: Portugal, Romania, Spain, Poland and Croatia. Nationals' reports will be compiling for the English summary by Spanish partner Fondo Formación Euskadi and uploaded to TECRINO's web site: www.tecrino-project.eu.

These reports provide analysis on VET systems and give us an overview of the best practices and challenges regarding implementation and promotion of the innovation and creativity in learning process. They covered perspectives of the both sides: teachers and learners.

Following points were elaborated:

• Identification and valorisation of the different trends (pedagogical, organisational, technical, thematic, etc.) linked to innovation promotion in the VET context

• Analysis of the most important needs and problems faced by learners and teachers to promote the innovation skills in learning processes

• Anticipation and knowledge of the most innovative methodologies which need to ensure the success of developing training processes that promote the innovation profiles in learners and teachers

• Elaboration of the processes map to facilitate a successful development of innovation skills in VET processes.

Research approach was based on data triangulation. Data was collected using three methods:

1) **Desk research** aimed at identifying and valorising the incidence of different trends linked to the innovation promotion in VET context.

2) **Questionnaires carried out with three different groups**. They were developed by Fondo Formación Euskadi and validated by all partners. The questionnaires captured the point of view of teachers and learners with experience in innovation and creativity promotion Participants chose a scale from 1 to 5, and they also had an opportunity to provide extra information and further comments.

3) **Focus groups** gathered further information from all groups and informal situation. The results of the questionnaires were presented to group of teachers and learners an discussed. The group size was from 5 to 8 participants, while discussions lasted between 40 and 60 minutes.

Currently, at the TECRINO website can be found report : ' Research and innovation in Romania:
Between poverty, imposture , and a two-speed Europe' created by Prof Ioan Şuşnea from the University "Dunarea de Jos" of Galati , as well as other white papers on the Romanian national strategy on innovation and research (http://www.tecrino-project.eu/repository).

6. TECRINO related projects

1. CREA NET 2.0
www.creabusinessidea.com

CREA NET 2.0 project, funded by the Sudoe Interreg Programme brought together partnerships from Portugal, Spain and France in order to promote creativity and innovation as a tool for solving problems in business. Basically, what this project aims to provide is a set of tools and tips so that one can be more creative and transform creativity into a competitive advantage through the development of new products.

In this context, the project is aimed primarily at small and medium enterprises with innovation needs, potential entrepreneurs, technological degree finalists, doctoral students and vocational training students, among others.

When visiting the project site, which is in Portuguese, Spanish and French (http://creabusinessidea.com/index.php), its utility becomes clear, due to the several publications available, entrepreneur toolkit, as well as a "crianometer" which consists in two tests - basic and advanced - to measure creativity. This is certainly a project to follow closely, especially for those who directly or indirectly deal with entrepreneurship and creativity issues.

2. TETRIZ – Teaching TRIZ at school
New way of teaching TRIZ
www.tetris-project.org

The project run from 2007-2009 and was focused on TRIZ methodology, aiming to develop a course and training materials to speed-up the learning process of TRIZ philosophy and instruments. It targeted both students and trainers, in order to introduce TRIZ at schools and into professional organizations. The project web site is an excellent source of links and materials on TRIZ and its applications.

3. Ilab2
Innovation Laboratories for the quality assurance of vocational education and training
www.ilab2.eu

While TECRINO aims to develop educational content for teaching creativity, Ilab2 assumes that the environment plays a key role in the development of creativity in the educational context, and aims to set up "innovation laboratories" - i.e. environments specially designed to foster creativity of GROUPS of students. The creativity lab is in phase of preparation at the University of Galati.

The project flyer is available ***here***

4.Training innovation
www.traininginnovation.eu

The project run between 2009 and 2011, and it was aimed at helping the training professionals to improve the transparency, the visibility and the development of the competences linked to their student's innovation, acquired through informal learning.

7. Success stories

Success story 1 Portugal

"Hydrogen Torch - HHO" the Perfect Combination of Creativity and Innovation

The design of the "Hydrogen Torch – HHO" constituted the Professional Aptitude Project (PAP) praised by the jury, where technical ability joined with product innovation demonstrated that Ricardo Vilaverde, a graduating student who attended the Renewable Energy Technical Course at Epralima Vocational Training School, is an example of creativity.

All students who attend a vocational training course must elaborate a Professional Aptitude Project (PAP) during the third year of their training cycle, and must present and defend their PAP before a jury. A PAP is a project that the students develop throughout their training, in order to have their practical and technical capacities validated. It was within this context that Ricardo Vilaverde presented a proposal for his PAP, designing a Torch that's runs on hydrogen. Considering that this product does not exist in the market, one must question how the student came up with this idea. Did the student demonstrate an enormous potential for creativity? Everything points to a "yes" despite the fact that we do not know if there were any external factors that favoured the idea: from the moment of its "birth" until the project was completed.

First of all, one must assume that the course that the student attended favoured the generation and experimentation of ideas and concepts, joined with the fact that there is still much to be explored, especially in the area of renewable energies. Secondly, the team of teachers was unanimous when they referred to the student's extraordinary abilities. According to the Course Director, Hélder Cerqueira "throughout the course, the student has always shown great ingenuity, which, in the opinion of the teachers, particularly those in the technical area, qualified him for a PAP that challenged these same capabilities." But the pedagogical work of the teaching team was crucial, because according to Hélder *"... the interests and abilities of the student associated to the motivation that was always provided by the teachers, was fulfilled in an extremely well organized PAP and as such valued by the jury of PAP (...)."*

Now let's take a look at Ricardo's perspective on how the process occurred:
First of all, the student stated that the theme "Hydrogen Torch - HHO" came from an idea based on research from various web sites, and because he took into consideration the fact that *"... the school would have a high expenditure on the acquisition of material for the already existing torch that works with bottled gas".* Thus, since the student found the idea interesting and useful, he began studying and testing the necessary materials and combinations to get the desired result: *"So, for the production of HHO, I used various elements to carry out the electrolysis of distilled water in conjunction with potassium hydroxide (KOH) as an electrolyte. The gas produced, when burned, allows a flame with high calorific power to be obtained, resulting from the presence of the hydrogen and oxygen",* referred the student.

The implementation of the idea was not a simple process, various tests and even reformulations of the initial idea were necessary: *"I realized then that I had to change the structure type, because it did not provide safety conditions and proper functioning."*

However, the student was able to achieve the proposed results, which generated a great satisfaction on behalf of the teaching team, and which constitutes another good example of what the students are capable of producing.

Success story 2 Croatia

LEGO® bricks - tool for IT project management

Have you ever thought that LEGO® bricks can be education tool to better and quicker grasp IT project management principles? Five years ago, then PhD informatics student and young entrepreneur Marko Velić wrote together with his fellow student and professor a paper *Metamodel of agile project management and the process of building with LEGO® bricks* here

The metamodel described a workflow that can be used for teaching and practicing the agile principles using bricks. Bricks are used as a medium to transmit agile principles practices to participants with various background knowledge and experience.

They test their educational model at the t workshop held at the 23rd CASE conference in Zagreb, in June 2011. There were 24 participants from various companies that had either technical or business backgrounds. The workshop was a big success, which encourage Marko to introduce this educational methodology to the wider audience. He started to teach this methodology at IT private college Algebra in Zagreb and in April this year, he run two day workshops for 60 teachers how to use LEGO as education tool for IT. (*here*)

Participants of the workshop on agile development using LEGO® bricks

8. Past Events

EQAVET Annual Forum
26-27 March 2014, Athens

The fifth EQAVET Annual Forum took place in Athens, Greece on 26-27 March 2014.
Agenda, video link and all information *here*

Syntea S.A. workshop in Croatia
11 June 2014, Zagreb

Free one day presentation on Polish experience in usage of SF and EU programmes for VET was held in Zagreb at the premises of the Pen Club, hosted by the Croatian SME e-learning provider Cognita www.cognita.hr.
The presentation was held by Dr Bartosz Sobotka of Syntea SA in front of 30 participants, mainly from the agencies and VET sectors in Croatia. It was also an opportunity for exchange experience and networking among Croatian and Polish partners.
Dr Bartosz Sobotka especially presented Syntea's VCC catalogues, that can be found *here*

3rd Ministerial meeting Western Balkans Platform on Education and Training
19-20 June 2014, Bruxelles

The results of a study on teacher training were presented together with stakeholder recommendations on reforms needed in teacher training. Reports can be found *here*

3rd Danube region forum
26-27 June 2014, Vienna

DANUBE REGION strategy

Danube region www.danube-region.eu comprise and links 14 countries with more than 200 million people. Those countries are on the different level of economic development, having different cultural backgrounds, but also having common living, common history and huge potential for cooperation.

The European Commission and the City of Vienna, in co-operation with the Austrian Federal Minister for Europe, Integration and Foreign Affairs are organized the 3rd Annual Forum of the EU Strategy for the Danube Region, which will take place on 26 and 27 June 2014 in the Vienna City Hall. More than 700 participants from the public, civil society and business attended the Danube Region's main event of the year.
Forum's overall title was *"We grow together – together we grow – Empowered for a prosperous and inclusive Danube Region"*, focusing on economic improvement, social inclusion and good governance.
VET and educational topics were presented through the presentation of the project Empowering Young People – Connecting Europe: Development and Implementation
of Innovative Student-led Regional School Projects on "Shaping Life" in the Danube Region and through the workshop Investing in Inclusive and Innovative Education and Training for Better Socioeconomic Outcomes
The participants had opportunity to learn more about the Danube Region
and its challenges in the 21st century and to create future partnerships.
Program agenda and all info about event *here*

IVETA Conference
19-24 Aug 2014, Helsinki and St Petersburg
www.iveta.org
IVETA 2014 International conference which brings you into two countries and two cities. You can join the conference either in both cities OR only in one of the cities.
The conference starts with cultural and educational programme in Helsinki followed by conference in Helsinki and St. Petersburg and closing up with cultural programme in St. Petersburg.

9. Forthcoming events

Meeting of directors- general for vocational training
10-13 Sep 2014 Vasteras, Sweden
www.asoo.hr

The Meeting of Directors-General for Vocational Training is an informal meeting held during every EU Presidency. Senior officials from the Member States and from applicant and observer countries are invited to the meeting, together with representatives of the European Commission, the European social partners, the European Training Foundation (ETF) and the European Centre for the Development of Vocational Training (Cedefop).

International Congress on Vocational and Professional Education and Training
15 - 18 September 2014, Zurich
www.vpet-congress.ch

Switzerland's dual-track Vocational Education and Training system is one of our country's great strengths. The initial and continuing training of young people is the foundation that enables economy and society to have an adequate number of skilled workers and managers. The private and public sector share responsibility for the vocational education and training sector and work together as partners.
In 2014, the Confederation will launch the first international congress devoted exclusively to dual-track vocational education and training.

TECRINO Project meeting in Bilbao
17 – 18 Sep 2014, Bilbao

Second project meeting will be opportunity to have an overview of the completed activities and discuss in detail WP3 , which dealing with development of the training tools for students and teachers.

Lifelong learning week in Croatia
29 Sep – 5 Oct 2014

Croatian Agency for VET and AE, organises week on importance of lifelong learning.
Many significant national researchers, athletes and entertainers will anticipate. The agenda and all details can be found *here*