

LATEST TRENDS IN CREATIVE ONLINE AND OFF-LINE LEARNING OF ENGLISH FOR SPECIFIC PURPOSES (ESP) AT TECHNICAL UNIVERSITY

Abstract: *At present the available online courses in teaching and learning languages develop students' linguistic skill. At the same time it is widely recognized that creative thinking skills may have a crucial impact on effective solutions for academic and professional tasks. Therefore, the goal of the study was to explore recent trends in online and off-line learning of English for Specific Purposes (ESP), and the integration of Information and Communications Technology (ICT) facilities into the creative learning methodology of ESP. The research was done on the basis of the Ministry of Education and Science of Latvia and Riga Technical University project "Development of Online Course Design and Delivery Approach in Creative Learning of ESP". The results obtained allowed to develop a model of a creative online course in ESP. It includes specific course content, creative process support (creative thinking tools, techniques and software) and corresponding course administration: selection of the learning content, user support, software environment and assessment techniques. It embodies purposeful development of students' professional communicative skills in ESP in the virtual environment and stimulating their creative thinking skills by learning creative thinking tools and techniques.*

Keywords: *ESP, online course design, delivery approach, cultural-historical activity theory, zone of proximal development, creativity, creative e-learning, creative problem solving tasks, ThinkTank software, deBono thinking techniques.*

INTRODUCTION

There is an increasing number of teachers who are willing to implement new media in their language teaching, and it has its impact on the structure of courses and their delivery. It is underlined that "the innovative potential of new technology in language course delivery is changing the ways we teach a language and indeed is changing the language itself" (Barnett and Sharma *in Schneider*, 2004:4). Introducing such changes means implementing more flexible education in terms of

- 1) time and location (relating to where students can carry out the learning activities associated with the course);
- 2) types of interaction;
- 3) forms of communication within the course;
- 4) autonomy, collaborative skills, self-management, and individual learning strategies.

Scardamalia and Bereiter (1996, in Daniels, 2001:103) argue that the kind of education that will best prepare students for life in a knowledge society should foster

- 1) flexibility,
- 2) creativity,
- 3) problem-solving ability,
- 4) technological literacy,
- 5) information-finding skills, and
- 6) a life-long readiness to learn.

Therefore, a topical task is to unleash students' creative potential not only in the face-to-face classes, but also in online studies. One of the key challenges facing the higher education system is to change the prevailing culture so that greater value is placed on students' creative development alongside with more traditional forms of academic development (Clemons, 2005; Jackson, 2006; Lantolf, 2006; Laurillard, 2004; Piirto, J., 2005; Porter, 2006; Stephenson, 2002; Rumpite, 1998, 2000; Surkova, 2002/2003, etc.) It is stated that, "although, students are expected to be creative, creativity is rarely an explicit objective of the learning and assessment process (except for a small number of disciplines in the performing and graphic arts" (Jackson, 2006:4).

According to Torrance, creativity is not a special, but a common ability, which is based on the constellation of the general intellect, personal features and abilities to think productively. Torrance specifically stressed that "people fundamentally prefer to learn in creative ways" (Torrance, 1983). These ways include exploring, manipulating, questioning, experimenting, risking, testing, and modifying ideas. Edward de Bono, the originator of lateral thinking and an acknowledged leading international authority in the field of creative thinking, writes that "creativity need no longer be a mystery or a special gift – it is a skill that can be learned and applied" (de Bono, 1996). He has always stressed the importance of moving away from traditional approaches and stereotype solutions, and developing the ability of seeing and making new connections which might lead to extraordinary and efficient solutions. The authors of the article favour a definition of creativity suggested by Seltzer and Bentley (Seltzer, Bentley, 1999:15 in *Craft, 2001*) that "creativity is the application of knowledge and skills in new ways to achieve a valued goal". To achieve this, learners should have four key qualities:

- 1) the ability to identify new problems, rather than depend on others to define them
- 2) the ability to transfer knowledge gained in one context to another in order to solve a problem
- 3) a belief in learning as an incremental process, in which repeated attempts will eventually lead to success
- 4) the capacity to focus attention in the pursuit of a goal, or set of goals (Craft, 2001).

Important are also the factors that may influence creativity, such as background effects, education, developmental patterns, career, environment (social, cultural, pedagogical, etc.), personality (temperament), interests, collaboration and teamwork skills, etc. (Vygotsky, 1978; Csikszentmihalyi, 1997, 1999; Runco, Pritzker, 1999; Starko, 1995; Sternberg & Lubart, 1999; Wells, 2002; etc.).

When studying creativity, researchers usually point out the *3 'Ps' methodology: the person, the product (result) and the process* (Elshout, 1996). *Creative people* are characterized as deeply interested in their subject matter which often starts in childhood. Another distinctive feature is their independence of mind, strong permanent liking for challenge and persistence. Fraenkel and Wallen (2006: 290) have shown in a survey that intrinsic motivation, problem finding, and questioning skills are considered to be the most important skills in predicting and identifying creative achievement. The *product or result* can be called creative, when it 1) helps to solve an important problem; 2) answers an important question, or 3) poses an important new problem or question. Equally important is the *creative process* itself that is connected with problem solving. There are two approaches to understanding the *creative process*. One considers creating as a process of a goal-directed management of the production of novelty, while the other points to its random character influenced by chance or inborn talent. The authors' approach is that students' creative potential can be purposefully developed.

Creative endeavor is stimulated by a contradiction or/and a problem situation which need to be solved. Wallas (1926) offered a four-stage model of the creative problem solving process which is still researched now, i.e.: preparation, incubation, illumination, verification. Torrance (1983) considered that any creative process consists of several steps: perceiving the problem,

looking for a solution, generating and formulating hypotheses, verification of the hypotheses, their modification, and finding a solution or a result. The stages of the creative problem solving process, according to Torrance and Myers' model (1970), are sensing problems and challenges, recognizing the real problem, producing alternative solutions, evaluating ideas, preparing to put ideas into use. The stages of Parnes, Noller and Biondi (1977) model, presented in their 'Guide to Creative Action', are: fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. Other researchers (Savage, Sterry, 1990:5) have identified six steps to the problem solving process:

- 1) Defining the problem. Analyzing, gathering information, and establishing limitations that will isolate and identify the need or opportunity
- 2) Developing alternative solutions: using principles, ideation, and brainstorming to develop alternative ways to meet the opportunity or solve the problem
- 3) Selecting a solution: selecting the most plausible solution by identifying, modifying, and/or combining ideas from the group of possible solutions
- 4) Implementing and evaluating the solution: modelling, operating, and assessing the effectiveness of the selected solution
- 5) Redesigning the solution: incorporating improvements into the design of the solution that address needs identified during the evaluation phase
- 6) Interpreting the solution: synthesizing and communicating the characteristics and operating parameters of the solution.

Understanding creative process and the creative personality behind it, may play an important role in realizing the true nature of the creative product. The authors of the article believe that creative problem solving can be briefly described as

- 1) problem clarifying and defining
- 2) selecting relevant information
- 3) identifying and evaluating alternatives
- 4) drawing conclusions and making inferences.

In addition to these, Csikszentmihalyi (1997, 1999) suggests that to understand creativity it is necessary to consider the culture and the field, as well as the individual. Creativity originates in the minds, actions and interactions of individuals, it is fundamentally a social-cultural concept (Csikszentmihalyi, 1997). It is the cornerstone of the cultural-historical (Vygotsky, 1978, 1994, 1999) and activity theory (Davydov, 1999; Engestrom, 1999; Гальперин [Galperin], 2000; Леонтьев [Leont'ev], 1977; Lompscher, 1999). According to this approach any kind of activity has its own definite content, structure, needs, motives, tasks and actions (operations). The activity to be developed is structurally analyzed according to the hierarchy of the underlying actions of which the activity consists. In such an approach the unit of analysis is the activity as a system. To understand why separate actions are meaningful one needs to understand the motive behind the whole activity; activity is guided by the motive. According to Vygotsky (in *Bedny, Seglin, Meister*, 2000), the process of internalization is a transformational creative process which changes the structure of activity. This transforming process depends upon cooperative labour, social interactions, and external and internal tools within the 'zone of proximal development' (Vygotsky, 1978:86).

Vygotsky points out that imagination is the mechanism of creativity, and creativity highly depends on imagination (Daniels, 2001; Ayman-Nolley, 1992; Lindqvist, 2003). There are two types of imagination: reproductive and creative (combinatory). Creative imagination is a mental activity that allows us to create a series of images in consciousness that we have not previously experienced (Kim, 2006). Besides that, in adolescence creative imagination is characterized by the collaboration of imagination and thinking in concepts. The interaction between imagination and thinking in concepts matures in the artistic and scientific creativity of adulthood (Smolucha in Kim, 2006). To produce a creative object or idea, according to Vygotsky, one must be able to

incorporate imagination and abstract thinking. Both the illogical and logical processes contribute to finding innovative ways in problem solving, where collaboration is crucial for producing something new. The course developers also followed the thesis that students' creativity is connected with their ability to see the whole earlier than its separate parts (Davydov, 1999; Гапьерин [Galperin], 2000; Lomsher, 1999; etc.).

The research project supported by the Ministry of Education and Science, Latvia, and Riga Technical University (RTU), Latvia, in which the authors took part, pursued the main goal of integrating creative learning methodology into e-learning in the online course of ESP – Technical English. *Creative e-learning was defined as the integration of creative learning methodology into e-learning facilities to promote creative abilities of the target population.*

THE GOAL OF THE RESEARCH

was to develop an online course delivery approach which would (1) be based on a sound methodological theory, (2) include purposeful integration of the creative component into the content and process of the online ESP studies, and (3) pilot the developed online course delivery approach in ESP practice with the first year engineering students.

THE OBJECTIVES OF THE RESEARCH were as follows:

- 1) to analyze of the main methodological approaches in developing students' creativity and in developing online course designs
- 2) to develop an online course design and a delivery approach in creative learning of ESP
- 3) to design the online course contents (texts, problem solving situations, tasks and activities, creative thinking tools and techniques)
- 4) to pilot the online course and discuss the project results.

MATERIALS AND METHODS

Researchers (e.g., Schneider, 2004) consider the following principles essential in developing up-to-date online courses for academic purposes:

- 1) appropriate technology should be selected according to the learner's individual needs
- 2) successful online courses need to have motivated and well-trained online tutors
- 3) a mix of face-to-face sessions, self study and collaborative tutor assisted online learning is the answer to get the best learning outcomes
- 4) learners develop an ability to engage in planning and monitoring their output, gaining more confidence
- 5) students can practice in a non-threatening environment as long and whenever they wish as the exercises are available whenever needed
- 6) endless amount of the resources, which are up-to-date, authentic and immediately available online learning material should be sufficiently flexible to cater for a variety of learning styles, personal skills and interests
- 7) the amount that should be developed online and how much should be developed face-to-face will depend on the target group, the learning level and the skills required a good mix of online course material needs to be designed in such a way that it caters for opportunities to interact, practice and expose the learner to authentic material and situations

Taking into account the above general principles, our project was specifically aimed at researching the issue of purposeful development of students' language as well as creative thinking skills in their entirety in the e-studies of ESP (Technical English).

The materials for the online course were selected on the basis of the systems analysis of

- 1) the dynamic changes that are taking place in the students' field
- 2) students' needs and interests
- 3) students' functions as future engineers, focusing on their skill to create knowledge rather than to reproduce it
- 4) students' curriculum in majoring disciplines.

The content of the course material corresponded to the most essential, generalized ('core') concepts and situations. The learning material in the creative online course comprised

- 1) modelling of authentic communicative situations in the students' professional area, e.g. Power Engineering
- 2) challenging content developed with student interests in mind
- 3) learning material containing a problem or a contradiction
- 4) sufficient material for thought, transformations and combinations (5-8 page illustrated texts)
- 5) multimodal way of presenting the material (texts, colourful pictures, diagrams and other visuals)
- 6) linguistic difficulty corresponding to the upper-intermediate level.

The analysis of the field and expert views indicated that one of the most essential problems that power engineering is facing today, is not only the application of modern technology to optimize the use of the traditional energy sources, but also the steadily increasing role of renewable energy sources in the world. The content and organization of the online course reflected this tendency. It resulted in a smaller number of texts and learning tasks, as they corresponded to the generalized and most essential ('core') concepts and situations which may help to transfer the acquired knowledge and skills to new professional situations in the future. The course content was also largely determined by the goals of the ERASMUS project on "*Consumer Citizenship Education*" (CCE) (<http://www.hihm.no/concit>), dealing with sustainable development of the environment and the role of an individual and the society in preserving it. It was reflected in most of the course materials and activities.

The course developers paid particular attention to the selection and adequate, professional explanation of the terminology included in the online texts. The goal was to select such a terminology which would constitute the 'core' terms of the power engineering field, integrating, first of all, the vocabulary dealing with the types and applications of renewable energy. The terminology was selected on the frequency basis which would allow students to move further independently when starting their professional careers. Therefore, before the course and during the selection of the course material the authors analyzed the available dictionaries in the area of power engineering as well as numerous publications. Besides, the contents of the online course reflects the curriculum in the technical disciplines studied at the Faculty of Electrical and Power Engineering, thus, achieving integration of the foreign language studies and major technical subjects.

The virtual setting included the Blackboard (Blackboard Inc.) software which was used for the delivery of learning material, basic performance assessment, user support, task information, and task feedback among other things (Fig. 1), while ThinkTank™ (Groupsystems company) was used primarily for problem solving tasks which required creative collaboration.

Solar is possibly the most expensive form of renewable energy, and is rarely economical except for localized generation. But costs are coming down and once installed the energy source is free. An alternative approach uses solar radiation to heat water directly.

Wave and tidal power: The oceans contain large amounts of untapped energy. Wave and tidal power technologies are comparatively new and largely unexplored compared with efforts to harness solar and wind energy. Development costs are high, meaning they are unlikely to be able to compete economically with conventional power sources in the near future.



Figure 1.
The template of the ESP course on the recent trends in the use of energy sources

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1. tradicionāls; nosacīts
2. parasts

southern Africa, Australia, and the north-east and north-west coasts of the US.

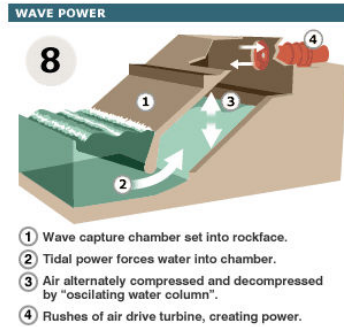
land, northern Canada,

Other

Biomass: A broad term covering organic non-fossil material of biological origin which constitutes a renewable energy source. This plant-derived material can be converted into fuels, chemicals, materials and power. Some types are being taken up more actively by industry - e.g. biofuels made from grain, sugar or vegetable oil - and gradually more cars are being produced worldwide that can run on biofuels or a mix of fuels.


Geothermal: Geothermal energy uses the heat in the Earth's core - either from rocks and water near the surface or through drilling deep wells. It accounts for only 0.4% of global generating capacity. Hot geothermal water is piped directly into buildings in Iceland to provide heating. Geothermal energy is widely used (directly and indirectly) in several other countries including the US, Philippines, Italy, Mexico, Indonesia, Japan and New Zealand.

Hydrogen: Although not a primary energy source, hydrogen is thought to hold great promise for the future. A carrier of energy, the gas is abundant and non-polluting. However at the moment it



The User support of the course included

- 1) Word assistant" tool (Fig. 2) to show translations, explanations, illustrations, and provide links for further reading – discretely and on demand
- 2) guides, instructions and manuals
- 3) face-to-face consulting during classes.

 **Word Assistant Updated - Unit 3 Ready**

Unit 3 (Guide to Nuclear Power) is now supported too along with units 1 and 2. As usual, if there are any words you think should have been explained or translated but were not, please go to the **Discussion Board** and write your suggestions.

Word Assistant is a simple tool that is available for the online versions of our main articles (e.g. **Global Energy Guide: Electrical Engineering**). It works automatically when the cursor is moved over a highlighted information or code online more elegantly.



This is an example of the information window which will be used to display all kinds of information to help in your studies with this course.

 **Sunday, 22 October**

In the section **Global Energy G**

Many thanks to th

Please note that successfully, please most important in answers, make m and, please, let's

Have a nice week

Yours
Diana Rumpite, instructor.

Figure 2.
The use of the World Assistant tool

At the same time *Creative process support* (Fig. 3) included such creative thinking tools, techniques and software as:

- 1) Brainstorming
- 2) Learning by teamwork – sharing knowledge and collaborating
- 3) Synectics (metaphors and analogies)
- 4) de Bono lateral thinking techniques (de Bono, 1996)
- 5) ThinkTank™ software for generation of ideas and further elaboration to find creative solutions.

<p>Creativity Basics</p> <ul style="list-style-type: none"> ◆ Defining Creativity ◆ Creative Abilities ◆ Blocks and Barriers ◆ Idea Squelchers <p>Creativity Techniques and Tools</p> <ul style="list-style-type: none"> ■ Brainstorming ■ Inquiry ■ Creative Problem Solving Model ■ Simulation and Role-play ■ Attribute Listing ■ Morphological Synthesis ■ Metaphors and Analogies, Synectics ■ Visualization and Imagination <p>Techniques of Lateral thinking</p> <ul style="list-style-type: none"> ■ Six Thinking Hats ■ The CoRT Thinking Programme 	<ul style="list-style-type: none"> ◆ CoRT One - Breadth and Direction <ol style="list-style-type: none"> 1. Plus, Minus, Interesting 2. Consider All Factors 3. Consequence and Sequel 4. Aims, Goals, Objectives 5. First Important Priorities 6. Alternatives, Possibilities, Choices 7. Other People's Views ◆ CoRT Four - Creativity <ol style="list-style-type: none"> 1. Yes, No, Po 2. Stepping Stone 3. Random Input 4. Concept Challenge 5. Dominant Idea 6. Define the Problem 7. Remove Faults 8. Combination 9. Requirements 10. Evaluation
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Figure 3.
Creative tools and techniques of the online course

Assessment techniques comprised individual and collaborative problem solving tasks and achievement tests to assess student creativity and acquaintance with the course material. The tests comprised true/false, multiple choice as well as open-ended tasks, where the answers were evaluated in accordance with the criteria developed before. Practically all the items in the online tests involved some thinking, and in many cases – creative thinking. E.g., one of the questions in the online test “Global Energy Guide” was: ‘*While being more expensive to set up, solar power is showing stronger growth than wind power in the UK. What are the reasons behind it? Is this trend likely to continue? Use facts to prove your point of view*’. Or, another task in the test ‘Nuclear Power’: ‘*Imagine a situation where a sudden and temporary shortage of raw uranium occurs globally and fuel assembly manufacturing facilities announce possible fuel shortages in the near term. Building of stock and uncertainty lead to fuel prices increasing by over 50%. What effect is it most likely to have on nuclear industry?*’. The tests were composed of tasks of a similar kind.

CREATIVE COLLABORATION USING THE THINKTANK™ SOFTWARE

Online decision making software by GroupSystems Inc., named ThinkTank™, was employed to creatively solve specifically designed problem solving tasks. Software allowed for anonymous participation and consisted of four principal steps for every task:

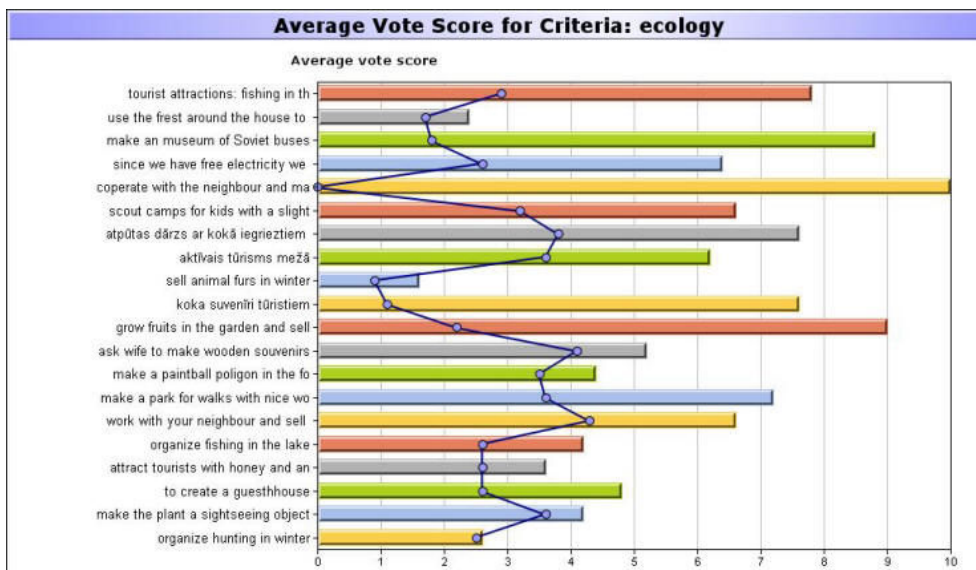
- 1) brainstorming – production of ideas and logical threads;

- 2) categorizing – selecting and storing the relevant ideas;
- 3) voting on various criteria – getting results on consensus or disagreement
- 4) evaluating the results – done at the end of each session with the results published in the Blackboard™ environment as part of the student portfolio.

With creative collaboration in mind, four distinctive open-ended problem solving tasks were produced, tailored specifically for use with the ThinkTank™ software. Sessions were held with groups of no more than 22 students each. Every session was limited to 80 minutes with students working synchronously. A non-participating moderator oversaw the process, providing assistance to students where necessary. The tasks mainly focused on social and economic challenges:

- 1) entrepreneurial,
- 2) public perception,
- 3) market sentiment,
- 4) lifestyle choices.

A total of 43 first year engineering students from RTU took part in the course. Students began with the entrepreneurial challenge, featuring vivid language abundant with similes. They took the role of a businessman, operating a small hydroelectric power plant business kept afloat by government subsidies. These, as they were told, were soon to be axed and electricity production alone would fail to generate enough revenue. The group joined forces to highlight potential opportunities for alternative business at the site of the plant and explored a new model of operation (Graph 1). It was followed by the public perception challenge introduced with a



Graph 1.
The criteria totals and the average divergence in solving the entrepreneurial challenge in the ThinkTank collaborative session

statement – “Nuclear fuel evokes as much fear and anxiety these days as it generates energy. We challenge you to design an experience which would make people like it instead!” The market sentiment challenge took the students back to the role of entrepreneur. Their enterprise was said to be facing declining market share and falling profits, which was attributed to inferior product. Students were challenged to come up with a plan addressing these problems without changing the product itself. The lifestyle choices challenge focused on social responsibility and encouraged students to explore the dilemma of conspicuous consumption. The arguments speaking against it such as consequential environmental pollution and wasting of precious resources were presented, while, at the same time, recognizing that it has always been human nature to display one's wealth and social status by acquiring expensive commodities. The task

was to design activities motivating people to display their wealth and status by more socially conscious activities such as environmental protection, devotion to social issues etc.

Creative output was later analyzed considering the criteria of fluency, flexibility, originality, and elaboration (Torrance, 1974). Fluency implies the ability to produce a large amount of ideas, flexibility – to produce a broad variety of ideas, to use a variety of strategies, or shift from one approach to another, originality is the ability to produce ideas away from the obvious, commonplace, banal or established, elaboration characterizes the ability to develop, carry out or otherwise elaborate on ideas.

One of the assignments was completed both without group collaboration software and later with it, which makes a direct comparison of the software and non-software approaches possible for a small number of students who did not take part in the prior task. Compared to the average results of the non-software approach by the rest of the participants, these students were more creative which could be attributed to use of sophisticated group collaboration software. A poll was also conducted and showed that students who participated in the group collaboration tasks thought that they had more motivation throughout the course than they would have had without these activities.

The online tests, in addition to assessing the reading comprehension skill and its subskills (comprehension of the semantic meaning, the content and the linguistic components), also included assessing of the development of the thinking skills. Most of the tasks considered, also such as open-ended questions, demonstrated more thoughtful, original and novel answers and solutions in comparison to the students' achievement at the beginning of the semester. While the results are encouraging, it is important to note that a period of only three months may not be enough to observe immediate changes in creative abilities of the students. The authors believe, however, that the specific creative and collaborative activities illustrated above and used in the course of "Creative Learning of ESP" could be integrated into other e-learning efforts to improve learners' self organization, foster creativity and decrease course dropout rates.

RESULTS AND CONCLUSIONS

The research project supported by the Ministry of Education and Science, Latvia, and Riga Technical University (RTU), Latvia, in which the authors took part, pursued the goal of developing a model of a creative online course design and delivery approach by integrating creative learning methodology with e-learning in the online course of English for Specific Purposes (ESP): Technical English. Creative e-learning, was defined as the integration of creative learning methodology with e-learning facilities to promote the creative abilities of our target audience.

Vygotsky's cultural-historical theory and its offspring – activity theory, about the unity of psychic and material processes and activities, served as the basis of our approach. According to Vygotsky (1978) psychic and cognitive activities are considered in close association with man's practical actions and interrelations with the surrounding world. One of the major developmental factors is the assimilation of social experience while interacting, in our case - in the computer-mediated collaborative environment. Emphasis was placed on the teaching and acquisition of skills within authentic and meaningful events.

The results of the research showed that by applying the methodological principles of the cultural historical activity theory in the selection and structuring of the course content (texts, tasks and activities), providing creative techniques and tools in an encouraging pedagogical environment stimulated student professional communicative skills and creative thinking abilities.

During the development of the online course it became apparent that only a few commercial products, supporting a collaborative workflow, were suitable to be used for sophisticated creative activities. Special tasks had to be developed, and the creative collaboration activities added significantly to the cost of the e-learning course. Nevertheless, the authors

conclude that the approach of integrating commercially available group collaboration software with an e-learning course is feasible for smaller projects.

The authors believe that e-learning will play a key role in delivering educational services in the near future and in recognizing the individual's creative potential and its 'zone of proximal development' in designing and launching e-courses in (foreign) languages for university students.

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