

EUROPEAN DIMENSION IN EDUCATION OF PRIMARY SCHOOL TEACHERS

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Learning from Experience and Reflection as Starting Point of Teachers Work

Action Research and Testing of Teaching Models

Abstract: *Europe as a space without economical borders presupposes also a union without barriers in culture and education. Apart from enabling to acquire experience and personal development of students and teachers at partner schools, the programs, witch support academic mobility, e.g. CEPUS and SOCRATES-ERASMUS, enable secondarily research orientated to European dimension in education, as well. During recent years, new models of improving of education for the 21st century according to the White Book and the Green Books of the European Commission, witch emphasise the professionalization of teachers' training, are being verified at universities in Europe. It proves that professionalism of primary school teachers should be based on several competences, especially on the ability of reflection and critical thinking. These problems are also topics of the collective research realised at the Department of Chemistry, Biology and Home Economy and at the Department of Primary Teacher Training of the Faculty of Education at the University of Ljubljana, Slovenia and at the Department of Biology at the Faculty of Education at the Masaryk University in Brno, the Czech Republic. Students and lecturers at both departments participate in the programme „Biology for life and health“.*

Keywords: *project “Biology for life and health”, meaningful teaching, action research, pedagogical constructivism, pre-concept, critical thinking, contemporary conception of reflection and self-reflection, learning from experience, pedagogical skills and experience, longitudinal research.*

Motto:

„Research and innovations is the core of improvement of teaching and learning. The role of teachers is central in this process. Because of that, they need to master professional practise based on creating, conveying and using of new information regarding their work. Their selection, training and professional development of teachers play a crucial role...” in education for the 21st century (OECD, 2001).

In a connection with an increasing number of global problems it can be heard about the crisis of Euroamerican society and the crisis of education. In a reaction the White Book of the European Commission defining the requirement for necessary change in a conception of education was published by the European Union in 1995. “**THE TEACHER**” is specified as the fundamental element of the paradigmatical change (DELORS, 1996).

At present we are asking many questions without answers, too. National empirical experience from teaching at universities has been insufficient. Because of that, we really appreciate international co-operation, research and study programs. In the full extent we have also begun taking advance of possibilities of international contacts in the EU. With the help of action research and on the base of foreign experience we have been improving education in the way of the project “Biology for life and health”.

The aim of this case study is to contribute to the discussion by the form of questions and answers. We are trying to outline some ways of the project innovations – ways concentrated on ensuring teachers’ (students’) natural science literacy and also training of teachers-expert for environmental education at primary schools. Our article is divided into three parts, based on time line of our longitudinal research. The first part describes in short essential problems, asks fundamental questions, outlines theoretical background and describes, by the form of key words, contemporary situation in the analysed field. As it became evident that our tasks were so serious and complex that it was impossible to complete them without assistance with the foreign partners, the second part describes way of the development and contributions of international co-operation.

In the third part we introduce partial results and conclusions of our international research. We present the self-constructed survey, which has been tested at foreign didactical conferences and in practice. This survey has been used for finding out students’ perception of basic curricula for the longitudinal research in the project “Biology for life and health”. A didactical test is the part of the survey, as well. Results of the test from the beginning of studies (the beginning of the bachelors programmes) have been getting compared as the pre-concepts of students of secondary schools interdisciplinary and since 2006 at the international level, too. A special questionnaire has been used as a control instrument for observing the changes. The mentioned results have been compared with results from the beginning of the fourth year of studies (the beginning of the masters programmes), when the students are meant to repeat the test. The questionnaire should serve as an autoregulation test simultaneously. It is used as an instrument for the training of active meaningful teaching of respondents at the beginning of university studies and also for self-reflection in the didactics of their discipline, as the verifying test of the absolute performance. Lectors in the project “Biology for life and health” have been using the results and the conclusions for preparation of flexible-open conception of teaching in the action research, as well.

What changes in the conception of education for the 21st century should the teachers’ university training react to?

(Keywords of the project “Biology for life and health”)

Global problems of the world and crisis in education call for the change of attitudes of the whole society as soon as possible (the White Book and the Green Books of

the European Commission), because: ...”*a human is becoming the victim of his own illusory successfulness, doing so among the society of performance and prosperity, which he created. Problems of humankind stands against goal-directed ‘material wellness’...*” (HORKÁ, p 9, 2000).

Education for the sustainable development of the society, the sustainable life and health has become the fundamental philosophy for the 21st century and of the new curricular documents. Thus, it should be a basis for the changes in particular pedagogical practice.

The multidimensional development of personality is still the aim of education (see the Universal Declaration of Human Rights). But the preference of attitudes, values and development of independent ***critical thinking*** and ***fundamental competences*** (leading to optimal decision-making about behaviour in life situations) has been emphasised explicitly, instead of acquiring a sum of pieces of knowledge and simple information (HORKÁ, 2000).

Innovations and new alternatives based on aged and deep experience from abroad have enriched the education system. They also inspired lawmakers in the preparation of the new Education Act. See the White Book of the European Commission, 1995, DELORS, 1996, *the Common European Framework – Key Competences for Lifelong Learning*, 2006, NEZVALOVÁ, 2006...etc.

The position of school as institution is changing so the inner life of school should be changed as well. Supporters of situated learning even speak about the second pedagogical revolution.

„*The first revolution in education meant the beginning of the formal school education: Children were taken from their natural environment and placed into institution – school. The second pedagogical revolution should mean that the formal institution – school – will overcome its enclosed culture and open itself to complicated ***situational learning***, which the human brain is accommodated to, and will respect social and distributive character of cognition...*”

School should co-operate with the closest „general community (family and neighbourhood) and also with corporations which a young person should be introduced to – ***open education***. Simultaneously, „**School inside should be community, which lives what it lectures and explains what it lives.**” (KALHOUST, OBST and col., p.169, 2002).

The conception of learning and teaching is changing; the pupils’ (students’) conception of subject matter is being searched. Beside the traditional conception of didactics, the constructivist didactics based on construction, or more precisely reconstruction of pupils’ (students’) knowledge is being promoted (MAREŠ, OUHRABKA, 1992). What it is new is the definition of the content of education, using of forms and modification of teaching methods. Society is demanding the professionalization of the teacher’s profession, i.e. the shift from a model of “*minimal competence*” to a ***model of “wide open professionalism”*** (SPILKOVÁ and col. p. 24, 2004).

It is necessary to view the program of transformation systemically – holistically, because the program is the consequence of the processes in progress not only in the Czech Republic and in Europe but also all over the world.

What is the contemporary situation in the analysed field?

At the beginning of 21st century we conceptualise education as a system.(DE-LORS,1996). We know “WHY”, so we are asking other questions: “Whom, what, when, where, with what aim” should we learn or teach to achieve an advancement of pupils’ natural sciences literacy in primary education? What do we understand under the term “the natural sciences literacy” in Europe? What should be the ideal abilities of a teacher who cultivates environmental (formerly ecological) literacy at primary school? ***How should we integrate curriculum, learning and teaching about nature and society for the natural sciences literacy in the training of teachers?*** How should we interconnect the processes of creating of knowledge, skills and values of students-teachers from an integrated field with the processes of pedagogical knowledge cultivation to comply with the European concept of the teacher as the reflective practitioner? And therefore, ***how should we integrally cultivate professional knowledge (SHULMAN, 1986) as the knowledge base of teaching, as an instrument for the deeper understanding, comprehension and solution to practical problems and real situations, as a base for self-presentation and for argumentation of teachers’ conception of teaching?***

The theory that professional knowledge creating the base for practical activities (decision processes, action and its reflection) of a teacher has been accepted as the basic character of the teacher-professional (an expert for learning and teaching) in Europe (SPILKOVÁ and col., 2004). Because of that, it is necessary to ask alternate questions, due to the creation of the new curriculum of integrated teaching: What are the sources of teachers’ pedagogical activity? What relationship is between teachers’ explicit (external) and implicit (internal) actions? What is the base of these both activities?

What are the pre-concepts of field-based basic knowledge (integrated for learning about nature and society) of secondary schools graduates? And therefore, is it possible to take advantage of secondary schools graduates’ knowledge base or is it necessary to transform it to new logical system, needed for pupils’ teaching in primary education? Are the students-teachers able to use basic scientific methods, experiments and arguments from scientific debates in their decision making? What are the typical teaching styles and the teaching conceptions of students-teachers?

We suppose that the way to the natural sciences literacy (including the environmental literacy) is in improving of critical thinking ability, cultivating of action situation-based learning with comprehension, learning in nature, responsible using of info-communication technology by pupils (students), professionalism of a teacher and teachers’ determination to humanise the teaching. By the help of the project “Biology for life and health”, in a way of the action research, by means of learning from experience and in co-operation with foreign colleagues, we have been trying to answer these questions.

The conclusions of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992 provided us with many inspirations to our project. Further the researches about function of brain in the process of learning; the evolution biology, the systemic approach and the theory of pedagogical constructivism were useful. But it was the Model of the Integrated Thematic Teaching (below ITT) that has become the primary example for the innovations (KOVALIKOVÁ, 1995).

At the beginning of the 21st century new university centres have been created in European countries. New programmes of students' and teachers' mobility have been presented; European states have created the common framework for education and research (DELORS, 1996, TEMPUS....). At Masaryk University in Brno, where 40 000 students should be studying in 2008, we have been building field centres for research and integrated education beside a new campus. In 1994 ***“Kejbaly”*** centre became one of the centres. It was later conceived as “Field Centre for Training and Education for Sustainable Development and Life (below SDL)” called ***“Educational centre for SDL”***. This is where the project “Biology for life and health” began to be realised (JEDLIČKOVÁ, 2004). Material conditions for integrated field teaching together with a draft programme were built there in 1998 - 2000 with the help of development grants. A multimedial classroom with a computer network functioning simultaneously as a reading room, study room for scientifically working students and the centre's staff and sanitary facility was built for studying and necessary using of information and communications technology (below ICT) in the environment of a model botanical “biotope garden” (JEDLIČKOVÁ, 2000).

In the project “Biology for life and health” the programme “Biology for life” was drafted and experimentally realised by a collective team at the “Kejbaly”, which was extended to further dimensions under the auspices of the research intent *“School and health 21”* of the Faculty of Education at Masaryk University and called “Biology for life and health” (JEDLIČKOVÁ, HRADILOVÁ, 2004). The research instruments were tested in the years 2001 and 2002.

When do we speak about co-operation in education for the integrated Europe?

The Department of Biology, the “Kejbaly” centre and the Department of Chemistry, Biology and Home Economy have been participating in solving a range of research and grant tasks in co-operation with departments of other universities in the Czech Republic and abroad. Very progressive relationships have been established in a number of countries in connection with academic mobility supported by EU programmes, e.g. CEPUS and SOCRATES. Doc. Matyášek from the Department of Biology at the Faculty of Education, Masaryk University in Brno is a co-ordinator of more than ten universities. The programme ERASMUS, which the Department of Biology has been participating in from its very beginning, has enabled acquirement of experience and personal development of students and pedagogues at partner schools in a number of European Union countries. It has secondarily enabled preparation of the above-mentioned research aimed at European dimension in education in connection with student and academic staff mobility.

A close co-operation with a Prof. Verčkovnik's team was established in 2002 through the CEPUS programme at the Department of Didactics of Biology at the Faculty of Biotechnology (below FBT), University of Ljubljana, Slovenia. The co-operation with Prof. Verčkovnik has substantially influenced the development of the project by the method of action research. The lecturing visit of her at the “Kejbaly” centre and consequential exchange visits and interships of the authors have enabled to incorporate a range of methods, techniques and strategies of active student's learning in the phases

of evocation – realisation of the meaning of one’s learning and reflection. ***Critical and creative thinking*** and ***autoreflective learning*** became the base for active student’s learning at the “Kejbaly” centre. Since 2003 a team under the leadership of Dr. Jelka Stgar from the Department of Didactics of Biology has been participating in the project. It is particularly orientated to learning from experience, field practices preparation, optional practices aimed at zoophobias and study visits of foreign students in Slovenia. This close co-operation has already begun a necessary part of the tested project “Biology for life and health” – members of the Department of Didactics of Biology FBT have been conducting lecturers and practices at Brno. Mgr. Ogorvec-Hradilová became a co-ordinator and student’s counsellor in Slovenia and the Czech Republic.

In 2004 Members of the Department of Primary Teacher Training at the Faculty of Education under the leadership of Doc. Darja Skribe-Dimec showed interest in the project in connection with our regular teaching at the FBT at University of Ljubljana. Thanks to the co-operation, annual exchange visits and personal concern for the project we have been recently solving together mainly questions of curricula didactic analysis for interdisciplinary integration. Doc. Maja Umek and Doc. Darja Skribe-Dimec are engaged in these problems in primary education. Apart from other things both departments participate in assessing results of introduction of new activating methods and didactical instruments into teaching and in providing assistance for students abroad.

With support of ERASMUS programme co-operation with Prof. Gaper’s (the Department of Biology) and Doc. Vencáľková’s (the Department of Ecology and Environmental Education) teams was established in 2005. Both are from the Faculty of Natural Sciences at Matej Bel University in Banská Bystrica, Slovakia. Slovak students realise annual field practices in environmental science at the “Kejbaly” centre. The co-operation has been further developing chiefly in the sphere of open education – the use of field centres, museums, environmental centres of ecological education and zoological gardens in primary education.

In 2001 a close co-operation was established with “Group for Environmental and Science Education” under the leadership of Dr. Majda Naji – the National Education Institute EU, Regional Unit Maribor, Slovenia. The authors of the project *“Biology for life and health”* became environmental education lecturers.

Annual interships of specialists are realised in ERASMUS programme. They enable not only to study and lecture at partner universities in the European Union but also to discuss the curricula of partner branches. Thus the above-mentioned partners have been actively participating so far in innovations of curricula according to the European dimension in education.

Since 2005 a common research has been prepared at the above-mentioned departments. It is aimed at the development of primary environmental education with help of constructivist approach to learning and teaching. Results and experience from the project “Biology for life and health”, which have been discussed at a number of international conferences (JEDLIČKOVÁ, HRADILOVÁ, TYMRÁKOVÁ, 2000 – 2006), have been accepted as basic groundwork for a research being prepared and they have been verified for particular countries.

Valuable consultation to the project, study of materials and methodics for occasions of their institutes were realised at the “Kejbaly” centre at the Faculty of Education MU in Brno by:

- Dr. Jelka Strgar a col., the Biotechnical Faculty of University of Ljubljana, Slovenia (2004, 2005, 2006)
- Doc. Darja Skribe-Dimec and Doc. Maja Umec, the Faculty of Education at the University of Ljubljana, Slovenia (2005, 2006) and Dr. Marjanca Kos (the same institution, 2006)
- Prof. Jan Gaper a col., the Faculty of Natural Sciences at the Matej Bel University in Banská Bystrica, Slovakia (2005)
- Dr. Eva Uhliarová (2005, 2006) and Dr. Elena Martincová (2006) (the same institution)

The workshops with Prof. Barbara Bajd, which were proceeded at the “Kejbaly” centre (2007) and in Slovenia in 2005, 2006 and 2007, were also important for the development of the project. The first part of the research is concentrated on the study programme Pedagogism for primary education. Because of that, it was decided to realise the verification study abroad, at the Department of Chemistry, Biology and Home Economy of Faculty of Education at University of Ljubljana, Slovenia.

Has the teacher’s preparation for education in the 21st century been improving?

With the help of several higher education institutions’ development grants a working group engaged in the integration of basic curricula was created. A new integrated learning model about nature and society called **“Integrated scientific base”** (below ISB) was conceived by interconnecting biology, physics, chemistry, geography, history and pedagogy. The basic curricula were exchanged by the strategy of multidimensional view on the development of interaction between nature and society. The method of lectures and discussions was used by a means of branch experts. It is not the task of ISB to offer a certain sum of knowledge to be possessed by a student-teacher but to develop the ability of thinking specific to particular branches. The aim is a teacher being able to think about natural phenomena in deeper even global context. It has proved that secondary school graduates in the Czech Republic have not been able to accept such demanding type of higher education for the time being. The problem of the curricula integration has not been solved so far. The less time a study programme limits to the integrated scientific base, the more complicated the problem is. The original draft syllabus and the content of curricula of the ISB model is being revised by a collective team of specialists at present.

As we believe that style of thinking cannot be transmitted, the ISB model in the project “Biology for life and health” at the “Kejbaly” centre is balanced by heuristic and research education in nature. The programme “Biology for life and health” is then conceived as a **model of learning from experience and open integrated teaching**.

Students are lead to the **autorefecting learning** based on the principle **of Bloom’s mastery learning system**. The basic curriculum is either mastered by a student or not. The education is supported by **self-reflective e-learning** through the information

system of Masaryk University and *alternate practice of students with pupils in educational terrain*.

The e-learning offers the students not only study materials but also tests "*Test yourself*" so as to be prepared for compulsory seminars. This is where in the form of group work it is possible for a student to learn according his/her individual needs. For reaching their goals the students may use the possibility of choosing optional courses or self-study leading up to the environmental specialisation at the centre. We are pleased that at the present time up to 60% of the students has been taking advantage of the possibility, especially those from combined mode of studies. The teaching was assessed as demanding but meaningful in a Masaryk University's questionnaire. The required targets were achieved by students in various time intervals (98%), which correspond to the principles of mastery learning. According to our informal observation, it is possible to find superficial approach to the subject matter (may be a habitude from secondary schools?) with a large proportion of full-time students in all our combinations at the beginning of their studies. It is difficult for them to view nature and society holistically, mostly because of their shortage of internalised concepts. Self-reflective active learning is surprisingly new for them. These problems surely deserve our attention, yet it is not systematically researched at the present time. Research is nowadays concentrated on testing the environment and teaching for the development of the programme in co-ordination with finding out pre-concepts from the branch and with students' pedagogical experience.

According to answers from an entry questionnaire the large majority of full-time students state no experience for the work with children - not even in the form of camps or other after-school activities. If we use the theory of implicit experience then we can by the help of research (analysis of a drawing of a natural sciences teacher) find very naive theories – deformed by school even to mis-concepts – in the student's self-conception as a teacher.

Basic the **1st thesis** of the programme "*Biology for life and health*":

You cannot teach about nature without nature and about children without children!

*If the change of a student-teacher's conception of teaching (i.e. personal development of a teacher) is the aim of teaching for the needs of education in the 21st century, than highly specialised and often long-time intervention is necessary for the re-formulation of the content of the term "conception of teaching" per se, if a student-teacher is to understand the subject matter and profession. From their first year at university, students are motivated for a role of environmentally thinking teacher. There is psychodidactic subject matter analysis being used at the centre. We believe that conceptions and skill training from the sphere of didactic must be kept improving since the first semester together with the learning about nature and society and in balance with social sciences curricula. This approach has been greatly appreciated by students (especially by students of combined mode of studies – survey, essay analysis 2003-2006). This is why a system of group seminar thesis, learning from experience named "*Dynamic model of learning from experience*" (JEDLIČKOVÁ, 2007), which is realised by students in 1st – 8th semester, set in the entire program "*Biology for life and health*".*

Except for the 1st semester, when students are getting accustomed to educational atmosphere, subject matter, work with technology, methodics of learning and work, verifying of seminar theses is realised in the form of alternative pedagogic field practice with pupils in the rest of semesters. Students work in an assistant's position in the bachelor's part of the programme while in the master's part already in the position of a specialised teacher. Group seminar theses are based on the principle of ***learning with mistake***, i.e. ***self-improvement with a help of group discussion and audio-visual record analysis with a specialist***. The technique of teaching is the same: preparation of a seminar thesis in a group, presentation of the preparation – discussions in seminar lessons, consultations with a lecturer, realisation with students in educational field practise, group autoreflection and audio-visual record analysis with lecturer, correction of the preparation in writing and assessment of experiment – graphical form, credit.

2nd thesis of the programme: **If teachers are to humanise teaching and realise with help of activating methods they must have personal experience with such kind of teaching.**

This is why the “Dynamic model of learning from experience” is targeted on this aspect. Each seminar thesis is oriented on the realisation of one activating method afterwards on the combination of more methods. Student will work up from simple micro-outputs with pupils during a training of practical activities in a game about educational system at the centre, to the demanding “Student Pedagogic Project ITV” (approximately 100 students co-operate at universities). The output of this project is student conferences on alternatives in teaching and SWOT analyses of schools. Especially motivating for students are commentaries of teachers from practise and feed back-reflection from pupils and co-operation with lecturers at department.

3rd thesis of the programme: **The mediate approach to subject matter is amended with the friendly approach.**

Five departments directly participate in the integration of subject matter and teaching in the course of eight semesters: physics, biology, chemistry, geography, history and pedagogy, further on ecological centres and clinical schools.

The project has been developing in international co-operation since 2001. Since the year 2002 a longitudinal research of the proposed integrated didactic model has been carrying out in the Czech Republic. Accreditory committees approved innovations in study plan, of which the model is a part, in 2006. In the same year a pilot study for the verification of the methodics and tools of testing knowledge was realised for the use abroad, under the guidance of Prof. Barbara Bajd and in the presence of the authors, at the Department of Chemistry, Biology and Home Economy of the Faculty of Education at the University of Ljubljana, Slovenia.

The same pilot study is being prepared for students with the collective of Dr. Jelka Strgar at the Department of Didactics of Biology at Biotechnical Faculty at University of Ljubljana, Slovenia and Prof. Gaper at the Department of Biology at the Faculty of Natural Sciences at Matej Bel University in Banska Bystrica, Slovakia.

It is becoming apparent that the questions of specialists preparing teachers as well as those of auxiliary professions are similar. (ŠVEC, 2005, NEZVALOVÁ, 2006...).

The European Parliament and the Council of the European Union issued in December 2006 “*Recommendation on Key Competences for Lifelong Learning*” (2006/962/ES) <http://www.rvp.cz/soubor/01140.pdf>. The thesis is fully accepted that the goal of preparation of students-teachers is not only handing of a sum of knowledge and skill training but also creating a condition for acting in various situations.

Does the teacher’s conception of teaching have to be changed?

Theoretical background of the project “Biology for life and health”.

The aim of the teachers’ effort should be then to help learning individuals to reconstruct contents of scientific knowledge on the base of creating relationship between the knowledge of respective scientific branch, interdisciplinary knowledge and the world of individual everyday experience (JELEMENSKÁ, SANDER, KATTMANN, 2003).

The learning individual is not any longer the one who does not know anything and comes to school so as to learn everything from teachers. A pupil (a student) is an intelligent being with certain pieces of knowledge (which not necessarily must correspond to scientific pieces of knowledge – *naive theories, pre-conceptions*), which should be with help of a teacher and a group of schoolmates verified, and completed if needed by activities at the school. *Pedagogical constructivism* is therefore often determined as an effort to overcome transmissive teaching. The constructivist approach emphasise *an active role of a pupil (a student), who constructs his/her meaning by him/her self* according to his/her already created mental structures = *active learning*. We talk about the problem of pupil’s (student’s) conception of subject matter and learning.

Phillips (1995) deals with three basic roles of learning individual in a constructivist class:

- 1) *Active role: knowledge and understanding require an activity of a learner, instead of a passive role of a recipient of pieces of knowledge.*
- 2) *Societal role: we do not build pieces of knowledge only individually, but in a dialogue with the others*
- 3) *Creative role: knowledge and understanding is formed and transformed.*

Pupils (students) come to lessons with various ideas that they created on the base of their own experience. According to Piaget they begin to understand only if new information “commixes” with these ideas. The initial ideas form a kind of “filters” trough that they accept or refuse new information. Teachers lead pupils (students) to active reconstructing their initial ideas in the interaction with the others. Lessons conceived as such strive to evoke certain unbalance between what a pupil (a student) knows and what he/she is getting to know. This approach strives to raise a problem between an initial idea and a new place of information. So as this discordance the pupil (the student) is constructing a new *solution*.

*“Knowledge is a result of a process of cognition, especially in the form of pieces of knowledge. Because a piece of knowledge rises from subject mind, that constructs it trough series of operations a thus adopt it, we designate this result of cognition by the term „acquirement“... According to Piaget the base of cognition is so called *scheme*. This scheme describes how a child think about functioning of world around him/her“* (ŠVEC, p. 30, 2006).

In a new conception of school a teacher even strive to deliberately raise a cognitive conflict among pupils (students). An individual attempts to tackle the cognitive conflict - not being always successful, though. It depends on his/her previous experience, abilities, inner motivation and will. Help of the others - parents, a teacher or schoolmates - is often needed. Such help does not consist in telling the individual how to advance onwards, though, but in providing him/her with key positions for overcoming the cognitive conflict, where by on the change of schemes and acquiring of new pieces of knowledge. We speak about learning from experience.

What happens if a teacher ignores pre-concept in teaching?

Older layers of knowledge are covered by new ones in mind and knowing is piling in separated layers under which original core of idea remains. A pupil (a student) is able to reproduce this information for certain time. If it does not interfere with the original structure, it hardly comes to understanding. Information is often forgotten and does not lead to the needed process of learning (the interconnected cognition is not created).

If a teacher diagnoses pupils' (students') pre-concepts and regard them as a significant factor determining learning, than the subject matter becomes the part of a pupil's cognition. Thus we encounter different understanding of a pupil's (student's) role in a traditional and constructivist lessons. (HRABÁČKOVÁ, 2006).

4th thesis of the programme: **Teachers are confronted with the task of changing their views on pupils (students).**

At the beginning of the 21st century such change is conceived as the base for professionalization of teacher's profession, on which is necessary to look systematically – holistically. Knirk and Gustafson (1986) remind that is not sufficient to make isolated innovations in a single lesson - just to use different methods. Systemic conception does not separate questions of WHAT TO TEACH from the questions of HOW TO TEACH, WHY TO TEACH and HOW TO ASSESS!

What role does the current conception of reflection and self-reflection play in personal development in the project “Biology for life and health”?

Constructivist didactics emphasise that a human learns only things, which he/she considers to be personally meaningful, which fits to the project of his/her own identity.

5th thesis of the programme: **„Providing a pupil (a student) perceives a certain theme as a part of his/her world, as a means of consolidation his/her personality, he/she is able to be engaged in it very intensively, even for the whole life“** (KALHOUST, OBST and col., p. 73, 2002).

We speak about explicit and implicit (tacit) knowledge according to the level of awareness of the knowledge by a subject as mentions ŠVEC (2005). It is formed on the base of experience while a subject is placed in situations and acts in them. It is active learning to experience – learning from practice.

According to the kind of information that knowledge carries in itself *conceptual, sociocultural and metacognitive knowledge* is distinguished. **Metacognitive knowledge** is **subject's knowledge about his/her own cognition and learning**. It is stressed nowadays that it is very important kind of knowledge, for it enables a subject to **regulate** his/her learning and action. The ability of **self-regulating reflection** as the base for lifelong learning is currently becoming a subject of intensive research all over the world (ŠVEC, 2006). **Educational autoregulation** is specified by HELUS (1992 p. 201 in ČÁP, MAREŠ, 2001): “*As a modus of behaviour of an individual towards himself/herself (self-strengthening, self-monitoring, self-assessment, self-instructing etc.)*”.

6th thesis of the programme: **A teacher should strength pupils' (students') self-esteem over reflection as well in his/her classwork.**

Experience leading to self-esteem – to the knowledge of their being able to achieve a positive result in learning activities – often shows itself in their enjoyment to plunge into new learning activities. So that inner-motivating incentives may lead up to the inner level of cognitive needs, which are the bases of the need of **lifelong learning**. Stimuli of didactic interaction and mutual positive relationships between a teacher and a pupil (a student) in classwork interfere also the emotionally motivating and decision-conative sphere of educational **autoregulation of a learner and a teacher.**

7th thesis of the programme: **The sharing is based on common learning (e.g. the co-operation in s group) when common experience is established.**

It is known that the cognition of the world in contact with one's peers but also with older schoolmates facilitates the construction of knowledge and teaches also how to co-operate (**couple, group, peer ... learning**). The sharing of knowledge occurs. The sharing of knowledge in a social group represents a recent sociocultural perspective in the construction of knowledge. Yet, the experience may be shared by subjects also when they acquire the knowledge in similar learning situations.

We speak about experience when knowledge is used in action. If experience is generally a means and the aim of cognition of the world (PRŮCHA and col. 2003), **which is based on senses, experience, social contact, mental and practical activity, than learning from experience may significantly influence student's conception of teaching providing the systematic use of socioconstructivist approaches and techniques of the development of reflection and self-reflection** (JEDLIČKOVÁ, 2007).

The longitudinal research of the project “Biology for life and health”

In 2006 the verification of methodics and the entrance test were guided under command of Prof. Barbara Bajd and supervision of authors of the project (Jedličková, Hradilová) for occasions of research in Slovenia. The selection of items was properly reconsidered in all tree countries to maximalize validity and reliability of the entrance

test. The common way of evaluation of the results was consulted several times. The Prof. Bajd's team pointed out some specifics in terminology, which are different in the Czech and Slovene education system. During the lecture intership of Prof. Bajd at the Department of Biology in Brno (March 2007) the last discussion were held to evaluate results of the first phase of pilot study in Slovenia. Below we present partial results of the unfolding international research.

The verification of innovations in teaching, aimed at application of contemporary psychodidactic theories in the field of environmental education to provide natural science literacy in Europe in the 21st century.

Questionnaire n. 1 (test n. 1 Student's conception of curriculum)

The questionnaire has two parts: the informative part (p. 1,4) and the test of student's conception of basic curriculum (p. 2,3).

The informative part (p. 1) contains open items: contact, functional (functional psychological, control) and contentual. Items on the page 4 are semi-closed, centred on meaning. The didactical test (p. 2,3) is the two-level test. Formally it looks like test based on selection of answers, but student-teacher choose his answer in two steps. First he/she names a product of nature (or uses the numeric label if he/she does not know the name). In second step he/she choose from set of arguments to give reasons for his/her previous choice. Apart from frequency of right answers the character of students' mistakes is inspected through evaluation, as well. Thus it is possible to motivate further analyse of particular misconceptions.

Through structuration of the test the classical technique has been used (ČÁP, MAREŠ, 2001).

Selection of items to testing basic curriculum has been done on the base of analyse of Czech school books and consultations with specialists from various faculties. Items that have all three participating states in common were finally kept in the questionnaire.

For use abroad the questionnaire had been translated into Slovenian language. The original Czech version is attached to the article in Czech and the slovenian version is attached to the article in English.

Summary:

K. Gergen (1994 in ŠVEC, 2006) accented: *“Knowledge is constructed by means of interplay between individual knowledge, attitudes and values of a subject and his/her social interactions in sociocultural context. There is a need of the interaction between cognitive an emotional aspects of cognition to be taken into consideration at the same time, though”*.

Particular effort to humanise schools and education has been resulting gradually in understanding the results of teaching as overall **educational autoregulation of a pupil's (student's) personality**.

V P R A Š A L N I K št. 1

Namen vprašalnika sta zbiranje informacij za delavce središča
in avtorefleksija študentov na začetku pouka

Vprašalnik bi naj služil kot osebni test in hkrati kot ponovitev učne snovi, ki bi jo naj
študenti poznali za svoje delo z otroki.

Opozorilo: Ta vprašalnik ne bo del ocenjevanja študijskih rezultatov, ampak bo upo-
rabljen le za statistično ocenjevanje začetnih informacij o študentih.

1

Informativni del

**1. Premislite in podčrtajte izrek, s katerim sami ocenjujete svoje znanje biologije
s srednje šole.**

nadstandardno - odlično - prav dobro - dobro - zadostno - nezadostno - ne znam se
odločiti

2. Premislite in dopolnite izrek (podčrtajte izbrano besedo).

..... SEM RAD V NARAVI

Vedno Zelo pogosto Pogosto Včasih Nikoli

3. Premislite, podčrtajte izbrano besedo in dopolnite izrek.

zelo priljubljen - priljubljen - niti priljubljen niti nepriljubljen - nepriljubljen - zelo ne-
priljubljen

NA OSNOVNI ŠOLI JE BILA BIOLOGIJA ZAME PREDMET, KER

(navedite pet ključnih besed)

4. Premislite, podčrtajte izbrano besedo in dopolnite izrek.

zelo priljubljen - priljubljen - niti priljubljen niti nepriljubljen - nepriljubljen - zelo ne-
priljubljen

NA STREDNJI ŠOLI JE BILA BIOLOGIJA ZAME PREDMET, KER

(navedite pet ključnih besed)

5. Premislite, podčrtajte izbrano besedo in dopolnite izrek.

V NARAVO HODIM

dnevno vsak drug dan več kot 1x na teden manj kot 1x na teden

manj kot enkrat na dva tedna manj kot 1x na mesec

Prepoznavanje

1. K vsakemu številu napišite NAZIV (vsaj rod) predstavljenega objekta

1. NAVADNA PŠENICA (<i>TRITICUM AESTIVUM</i>)	2. Deževnik (<i>Lumbricus terrestris</i>)
3. NAVADNI BRIN (<i>JUNIPERUS COMMUNIS</i>)	4. KUNA ZLATICA (<i>MARTES MARTES</i>)
5. MAJSKI HROŠČ (<i>MELOLONTHA MELOLONTHA</i>)	6. POR (<i>ALLIUM PORRUM</i>)
7. RJAVI PREMOG	8. JABLANA (<i>MALUS DOMESTICA</i>)
9. (EVROPSKA) ŠČUKA (<i>ESOX LUCIUS</i>)	10. TRNASTOČELA RAKOVICA (<i>CARCINUS MAENAS</i>)
11. RŽ (<i>SECALE CEREALE</i>)	12. NAVADNI KLOP (<i>IXODES RICINUS</i>)
13. NAVADNI OREH (<i>JUGLANS REGIA</i>)	14. NAVADNA BODIKA (<i>ILEX AQUIFOLIUM</i>)
15. KAMENA SOL	16. BRADAVIČASTA MORSKA ZVEZDA (<i>MARTHASTERIAS GLACIALIS</i>)
17. NAVADNA LISIČKA (<i>CANTHARELLUS CIBARIUS</i>)	18. VELIKI DETEL (<i>DENDROCOPOS MAJOR</i>)
19. NAVADNI PUPEK (<i>TRITURUS VULGARIS</i>)	20. NAVADNA BUKEV (<i>FAGUS SILVATICA</i>)
21. PELARGONIJA (<i>PELARGONIUM ZONALE</i>)	22. BELOUŠKA (<i>NATRIX NATRIX</i>)
23. MALI KOPRIVAR (<i>AGLAIS URTICAE</i>)	24. NAVADNA SMREKA (<i>PICEA ABIES</i>)
25. PIRIT	26. VRAŽJI ZOBAN (<i>BOLETUS SATANUS</i>)
27. OSTROLISTNI JAVOR (<i>ACER PLATANOIDES</i>)	28. ZELENA (<i>APIUM GRAVEOLENS</i>)
29. ŠČINKAVEC (<i>FRINGILLA COELEBS</i>)	30. NAVADNI LAN (<i>LINUM USITATISSIMUM</i>)
31. RJAVI UHATI NETOPIR (<i>PLECOTUS AURITUS</i>)	32. PARADIŽNIK (<i>SOLANUM LYCOPERSICUM</i>)
33. VELIKI VRTNI POLŽ (<i>HELIX POMATIA</i>)	34. APNENEC
35. VRTNI OGNJIČ (<i>CALENDULA OFFICINALIS</i>)	36. MARTINČEK (<i>LACERTA AGILIS</i>)
37. JEZERSKA BREZZOBKA (<i>ANODONTA CYGNEA</i>)	38. PANTERJEVA MUŠNICA (<i>AMANITA PANTHERINA</i>)
39. DIVJI KOSTANJ (<i>AESCULUS HIPPOCASTANUM</i>)	40. NAVADNA KRASTAČA (<i>BUFO BUFO</i>)

2. Ob vsakem pojmu naštejite najmanj tri primere

PROIZVAJALEC 1, 3, 6, 8, 11, 13, 14, 20, 21, 24, 27, 28, 30, 32, 35, 39

PORABNIK 4, 5, 9, 10, 12, 16, 18, 19, 22, 23, 29, 31, 33, 36, 37, 40

RAZKROJEVALEC 2, 17, 26, 38

3. Uvrstite objekte v pravilno skupino

Minerali 15, 25

Kamnine 7, 34

4. Uvrstite objekte v skupine

ZELENJAVA 6, 32,	SADJE 8, 13
POLJŠČINE 1, 11, 30	ENOLETNE RASTLINE 35
OKRASNO GRMOVJE 3, 14	KONIFERE 3, 24
STRUPENE RASTLINE 3, 14, 32	RASTLINE, NEVARNE ZA OTROKE (BODICE, TRNI, ALERGENI) 3, 21, 14

5. Uvrstite objekte v pravilne družine

BOROVKE 24	RAZHUDNIKOVKE 32
NEBINOVKE 35	KOBULNICE 28
ROŽNICE 8	LILLJEVKE 6

6. Uvrstite objekte v pravo skupino

UŽITNE GOBE	NEUŽITNE GOBE	STRUPENE GOBE
17	26	26, 38

7. Razporedite objekte glede na prehranjevalno specializacijo

MESOJEDEC ALI PREDVSEM MESOJEDEC	VSEJEDEC	RASTLINOJEDEC ALI PREDVSEM RASTLINOJEDEC
9, 19, 31, 4, 10, 12, 16, 22, 36, 40	29, 37, 18	5, 23, 33, 2

8. Razporedite številke v skupine.

KOLOBARNIKI 2

POLŽI 33

ŠKOLJKE 37

PAJKOVCI 12

RAKI 10

ŽUŽELKE 5, 23

RIBE 9

DVOŽIVKE 19, 40

PLAZILCI 22, 36

PTICE 29, 18

SESALCI 4, 31

DRUGA SKUPINA 16

7/06: VÝZKUMNÝ PROJEKT PdF MU pro rok 2006 (kategorie Ab) Výzkumná a odborná činnost akademických pracovníků a magisterských studentů Transformace zkušeností ze zahraničních pobytů v zemích EU (ERASMUS aj.) do programu „Biologie pro život a zdraví“ na PdF MU v r. 2006

EVROPSKÁ DIMENZE VE VZDĚLÁVÁNÍ UČITELŮ PRIMÁRNÍ ŠKOLY

Zkušenostní učení a reflexe jako východisko práce učitele Akční výzkum a testování výukových modelů

Abstrakt: Evropa, jako prostor bez ekonomických bariér, předpokládá rovněž unii bez hranic kulturních a vzdělávacích. Akademickou mobilitu podporují programy, jako např. CEEPUS a SOCRATES-ERASMUS, umožňující nejen získávání zkušeností a osobnostní rozvoj studentů a pedagogů na partnerských školách, ale také sekundárně výzkum zaměřený na evropskou dimenzi ve vzdělávání. V průběhu posledních let jsou akčními výzkumy na univerzitách v Evropě ověřovány nové modely orientované na zkvalitnění vzdělávání pro 21. století dle Bílé a Zelené knihy EU. Klade se v nich důraz na profesionalizaci přípravy učitelů. Ukazuje se, že profesionalita učitele pro primární školu se musí opírat o řadu kompetencí, zejména o schopnost reflexe a kritického myšlení. Danou problematikou se zabývá i společný výzkum realizovaný na katedře biologie a katedře pro přípravu učitelů primárním vzdělávání PdF Univerzity v Lublani (Slovinsko) a na katedře biologie PdF MU v Brně, mezi nimiž dochází pravidelně k mobilitě studentů i pedagogů v projektu „Biologie pro život a zdraví“.

Klíčová slova: projekt „Biologie pro život a zdraví“, smysluplné učení, akční výzkum, pedagogický konstruktivismus, prekoncept, kritické myšlení, současná koncepce reflexe a sebereflexe, zkušenostní učení, pedagogické dovednosti a zkušenosti, longitudinální výzkum