

## LEARNING FROM EXPERIENCE AND KNOWLEDGE BASE OF TEACHING

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### Student Pedagogical Project in Educating Primary School Teachers

#### *Action Research and Testing of Teaching Models*

**Abstract:** *The case study presents a part of our research dealing with the implementation of learning from experience as a basis of teachers' knowledge base in an integrated didactical (natural) science course in study programme Pedagogism for primary education. It is a part of the project "Biology for Life and Health", which enables to acquire experience, enables personal development of students and pedagogues at partnership schools and also research aimed at the European dimension in education. New models oriented to improving the quality of the education for the 21<sup>st</sup> century according to the White and Green Books of the European Commission – emphasising the professionalization of teachers' training – have been verified by action researches at European universities over the last years. It has proved that the teacher's professionalism for primary school must rely on a range of competences, primarily on the ability of reflection and critical thinking.*

**Keywords:** *action research, learning from experience, pre-concepts, critical thinking, reflection, personal development, pedagogical skills, reflection skill, longitudinal research*

Motto:

*...Teaching as a professional role faces decisive change in the coming decades: teachers and trainers become guides, mentors and mediators. Their role – and it is a crucially important one – is to help and support learners, who as far as possible, take charge of their own learning. The capacity and the confidence to develop and practise open and participatory teaching and learning methods should therefore become an essential professional skill for educators and trainers, in both formal and non-formal settings. Active learning presupposes the motivation to learn, the capacity to exercise critical judgement and the skill of knowing how to learn. The irreplaceable heart of the teaching role lies in nurturing precisely these human capacities to create and use knowledge...*

*(A Memorandum on Lifelong Learning, Commission Staff Working Paper, 2000.)*

The world is becoming increasingly complicated. Scientific knowledge appears to be vital to the health of nature, society and an individual. This is why many educationally advanced countries are still more intensively concentrating on (natural) science curriculum, on basic knowledge (skills, values), on the so called ***scientific literacy***. Environmental literacy (formerly ecological literacy), eventually valeological (“health”) literacy are considered to be the most important parts of scientific literacy.

New holistic view on nature and society, education and school leads to changes in the ***conception of learning and teaching***, to the integration of basic curricula, to changes of used forms and methods. Not only the professional approach, but also achievements in the sphere of transforming education for the 21<sup>st</sup> century are expected from teachers. Therefore the integrated teaching about nature and society in primary education – as a presupposition of scientific literacy, is becoming an important subject of interests and researches. If a teacher is to be a vehicle of changes in education, then the research subject must be the ***teacher’s conception of teaching***.

In this report we attempt to present and explain innovations in the training of student-teachers for environmental education, which have been verified for several years in the project ***“Biology for Life and Health”*** at the Faculty of Education at Masaryk University at Brno.

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

Quot.: *“Provided a pupil (student) perceives a certain theme as a part of his/her world, as a means of strengthening his/her personality, he/she is able to devote himself/herself to it very intensively, even for his/her whole life”* (KALHOUST, OBST and col., p. 73, 2002).

Therefore the key words: ***health, nature, pupil-student-teacher, integration, pedagogical constructivism, active learning from experience and autoregulation of learning, knowledge as experience from activities*** ... have become a nucleus of curricula changes in student-teachers’ training and a theoretical starting point of innovations. The project ***“Biology for Life and Health”*** has been developed in long term by action research. The core idea of the project is ***learning from experience***:

## **If a teacher is to be an expert on learning and teaching, he/she must have his/her knowledge base in experience!**

In the project “Biology for Life and Health”, the model of transmissive teaching at lectures is balanced by heuristic teaching at practicals and learning from experience in terrain. The integration of psycho-didactics and so called alternative pedagogical practice in educational environment specific to the specialisation of a course is used in compulsory scientific practicals. Supplementing intermediary approach to a subject matter with friendly approach seems to be a successful strategy for motivating student-teachers to acquire knowledge base of teaching (experience) in their training.

It means that apart from the classical pedagogical work experience at schools, student-teachers acquire also in scientific courses pedagogical experience in the form of group seminar theses. They verify their results by the help of alternative practice with pupils and their pedagogues in educational terrain. It is the ***“Dynamic Model of***

**Learning from Experience**”, which is a part of the programme **“Biology for Life and Health”** of the same name project (see JEDLIČKOVÁ, 2007).

We attempt to explain in what we see the principle and significance of integrated learning from experience as the environment for formation of **environmental teacher’s conception of teaching** on the base of case study about open teaching, **“Student Pedagogical Project of Integrated Learning on the Topic Soil”**, which was realised in the study programme Pedagogism for Primary Education in 2007. It is one model of friendly approach to subject matter in the **“Dynamic Model of Learning from Experience”**.

The report is divided into three parts according to the chronology of longitudinal research of the project. The first part describes fundamental problems in short, raises fundamental questions, outlines theoretical starting points and depicts in the form of key words the state of problems being solved. Because it has shown that the situation is so complicated that it cannot be solved without the co-operation of a team of specialists, the second part describes development and contribution of the cooperation. The third part describes a particular Student Pedagogical Project on the Topic Soil, as a part of the programme “Biology for Life and Health” and the “Dynamic Model of Learning from Experience”, including the results of a questionnaire, which is used for the self-reflection of students and the self-reflection of the authors of the project as well.

## **What are the theoretical starting points of innovations in the student-teachers’ training for the 21<sup>st</sup> century?**

### **Key words, key questions of the project “Biology for Life and Health”:**

Various alternatives and innovations based on long-time experience abroad are permeating into our education (*White Book of the European Commission*, 1995, DELORS, 1996, *Recommendation on key competences for lifelong learning*, 2006, etc. see NEZVALOVÁ, 2006). They inspired the law-makers in creating new education law. The status of school as an institution is changing; the inner life of school should change (*White Book*, 2001, RVP ZV, 2004....).

A teacher-professional is defined in Europe as an expert on learning and teaching whose **“professional knowledge”** forms the base of his/her practical activities – decision making processes, action and its reflection (SPILKOVÁ and col., 2004).

The realisation of curriculum by the intermediary approach to subject matter appears to be already little effective for healthy life of an individual in 21<sup>st</sup> century society. **Open teaching** is necessary for the requirements of lifelong learning (*Memorandum*, 2006).

**Teachers face the task of changing their view on pupils (student-teachers).**

It should be the aim of teacher’s effort to help learners reconstruct contents of scientific knowledge on the base of creation of relationship between the knowledge of a relevant scientific field, interdisciplinary knowledge and the world of an individual’s daily experience (JELEMENSKÁ, SANDER, KATTMANN, 2003). A change in the **conception of teaching** výuky-classwork is necessary.

## What is the role of social constructivism in the new conception of teaching?

Quot.: “*Social constructivism is a way of thinking or deliberation about cognition on the principle of **critical thinking**, which can be helpful in creating models of learning, teaching and curricula materials for the new conception of education* (KALHOUST, OBST and col., p. 73, 2002). Pedagogical constructivism has become the nucleus of innovations in teaching. Student-teacher cognizes, acquire and judge pieces of knowledge as social constructs on the base of his/her experience.

A learner is not the one who does not know anything and comes to school in order to learn everything from teachers any longer. A pupil (student-teacher) is an intelligent being with certain knowledge. These do not necessarily need to correspond to scientific knowledge – ***naïve theories – pre-concepts or mis-concepts***. And these should be verified, amended or re-constructed by activities at school with the help of a teacher and a group of schoolmates. The conception of learning and teaching is changing.

## What do we understand under the term ***contemporary conception of teaching***?

It is generally understood under the contemporary term ***teaching and learning***, as Kurelová and col. do (2007):

**Classwork** is a complex process, which consists of the unity of **teaching** as a managing activity of a teacher (lecturer, tutor etc.) and **learning** as an active action of a pupil (student, learner, participant of studies, further see pupil). A teacher's function is to manage and a pupil's is to be lead, managed in this process. A teacher is able to manage only when he/she controls continuously whether and how pupils learn. Such control is enabled by a sufficient flow of so called feedback information from a learner. **Classwork** according to Byčkovský means a mutual interaction of educating subjects (teachers) and subjects who are educated (pupils, students) within the frame of organized education. Mutual interaction is realised by the activity of a teacher – **teaching** and activities of pupils – **learning**. Changes in ***personality of a pupil*** are the results of classwork.

**The process of teaching** (classwork) can be understood as ***special dynamic human contact*** between a teacher and a pupil that occurs in class and in the time of school attendance. Mutual relationships between a teacher and pupils produce certain kinds of activities. Mutual working and ***joint action*** lead to the fact that their actors begin to be **aware of other people** and of themselves; mutual relationships begin to be clearer. Mutual working and joint action enable a teacher and pupils to get to know one another better, to **get to know themselves**, to discover mutual relationships, to form one another.

If we want to prefer in social contact the very human relationship of a teacher and pupils under the conditions of classwork, than we must regard **elements of didactic system**, i.e. ***aims, content (subject matter), methods, organizing forms and material didactic means*** as a spectrum through which this human relationship is realised.

It shows that there is a need to build classwork on the creation of good relationships towards pupils, which would bear ever-present **teacher's respect** for each pupil as a unique human being. Such relationships would stimulate balanced individual and

social development. Development balanced from the perspective of rational, emotional and volitional stimuli in the environment of independent and free action of pupils, which must also lead to individual responsibility.

A teacher should be prepared for lifelong, continually open reflection from pupils and for permanent self-reflection in teacher's role, which he/she practise inwardly so as the relationships between a teacher and pupils would not go into extremes. A pupil-student-teacher should gradually become a subject of his/her own self-development under such professional guidance. This is the way of assuring scientific literacy.

During the innovation of environmental education – the creation of curricula for integrated teaching about nature and society, we raise these questions in the study programme of student-teachers:

*How should we cultivate professional knowledge (SHULMAN, 1986) as knowledge base of teaching, as an instrument for deeper understanding, consideration and solving of practical problems and real situations, as a starting point for own presentation and argumantation of environmental teacher's conception of teaching for education in the 21<sup>st</sup> century?*

In the project "Biology for life and Health" constructivist didactics has been establishing itself besides the traditional conception of didactics, which proposes construction or more precisely re-construction of student-teacher's conception of teaching. That is the development of active action learning and also teaching. It is the aim of the project to acquire explicit and implicit knowledge by the help of learning from experience, to cultivate the ability of self-reflection up to the autoregulation of learning, later of teaching.

Quot.: *"The best outer management of pupil's learning is the one that gradually eliminates itself to the benefit of autoregulation"* (Kulič 1992 in ČÁP, MAREŠ, p. 519, 2001). It is the teaching supporting autoregulation - that is the capacity of self-reflective practice in learning and teaching.

## **What could be the role of having the knowledge of pre-concepts in teaching and learning?**

Construtivist theories of learning (e.g. ČÁP, MAREŠ, 2001 etc.) mention these situations:

### **1. Teacher ignores pre-concepts of pupils (students) in teaching:**

Older layers of knowledge are covered by new ones in the mind of a learner and knowledge is piled up in separate layers, under which the original core of concepts (naïve theories) remains. A pupil (student-teacher) can verbally reproduce new information for certain time, but if they do not actively (in action) interfere with the original structure of concept, everlasting understanding – formation of experinece, hardly occurs. After some time the information is forgotten and it does not lead to desirable process of learning. Interconnected knowledge – acquaintance with something in action – experience - is not constructed. It is the problem of superficial approach to learning.

### **2. Teacher uses pre-concepts of pupils (students) in teaching:**

Teachers lead pupils (student-teachers) to actively reconstruct, preferably in

interaction with other learners, their original concepts. So conceived teaching strives to evoke certain unbalance between what a pupil (student-teacher) knows and what he/she cognizes; to invoke a **problem** between existing concept and new information. In order to solve the discrepancy, the pupil (student) constructs new solution. Thus the learning with understanding = learning from experience occurs through action.

Constructivist approach emphasises the **active role** of a pupil (student-teacher) who **constructs** meanings of concepts **by himself/herself through action** in accordance with already created mental structures = active learning. Active learning is a base for an in-depth approach to learning; one of the project's aims. According to Phillips (1995) basic **roles of a learner in constructivist teaching** are defined as follows:

- A. Active role: **knowledge and understanding require learner's activity instead of passive role of a receiver of pieces of knowledge.**
- B. Social role: **pieces of knowledge are not built individually, but in a dialogue with others.**
- C. Creative role: **knowledge and understanding is created and re-created through action.**

## What do we understand under the term integration?

Quot. "*Integrated teaching corresponds to schematic cognition of the world, therefore facilitates the process of learning. Tuition can concentrate on relatively small number of basic aims and pieces of knowledge*" (LEPIL, p. 61, 2006).

Dissaccord between rapidly increasing volume of new pieces of knowledge, their practical applications and limited possibilities of school teaching is one of other current basic problems of education (especially in the sphere of (natural) scientific fields). That is why didactics of (natural) science courses and also school practice search the ways to bridge the discrepancy. Various approaches to the selection of subject matter, its organization into didactic scheme and to the choice of methods of transferring new knowledge in teaching are exercised. More and more frequently innovations exceed the framework of particular courses and head to the widely conceived teaching of (natural) science. In so happening, further relations to dominant branches, mainly in the sphere of science/technical fields, e.g. modern technologies and other fields, adherent to contemporary level of society cannot be precluded.

Ideas of integration and also first projects of integrated education in natural sciences, which were based on the works of psychologist *R. Gagné*, originated in the sixties of the 20<sup>th</sup> century and were appreciated in supranational world organizations. ICSU (*International Council of Scientific Unions*) established unitary commission for the teaching of natural sciences and similar department rised with UNESCO.

ICSU with the support of UNESCO held several conferences at which pivotal conceptions of perspective integrated didactic systems were formulated. According to the level of integration, the *integration of science curricula* can be classified as follows:

1. *coordinated* teaching
2. *combined* teaching
3. *amalgamated, united* teaching.

With the **amalgamated, united teaching**, which is promoted chiefly in primary education, the border between courses disappears and the teaching starts with some general problem (e.g. the topic “Soil”). The topic is solved by all the natural sciences and eventually other sciences together. This extreme case (sometimes termed **integration** in the narrow sense of the word) comes from the tradition of Anglo-Saxon school.

As Bilek (2006) mentions: Integrated teaching could be conceived in various modes. Process, thematic, applied science, environmental and patterns approaches are distinguished.

- A) **Process Approach** (*approach from the perspective of scientific work processes*) is based on the teaching of basic scientific work processes, beginning with observation and classification and ending with experimentation, designing of experiments and data analysis. During these activities an individual gets to know the basic information through his/her own exploration (about nature and society) **actively in action**. He/she acquires new knowledge independently or with the help of a teacher or colleagues = **individual or group (binate, peer....) learning**. An important part of this approach is always the analysis of results and procedures, reflection and confrontation with an acknowledged scientific process. Learner compares his/her processes with scientific processes while using autoregulation or reflection with the help of a specialist or a group. We talk about **learning from mistake** in the **integrated learning from experience**. The stress is laid on the means and methods of acquiring new knowledge.
- B) **Thematic Approach** *is often applied in the form of **project teaching** the effectiveness of which is assessed by the analysis of project's outputs.*
- C) **Applied Science Approach** *accentuates mainly (natural) scientific knowledge in connection with human work. It classifies the knowledge according to manufacturing processes of industry in the area of the school, as a rule.*
- D) **Environmental Approach** *assesses and classifies knowledge about nature from the perspectives of human relationship towards the environment.*
- E) **Patterns Approach** combines the perspective of scientific work processes and the perspective of conceptual structure. The constitutive starting point is to understand scientific concepts and the concepts of pupils (pre-concepts) as equivalent sources for the reconstruction of content structure. Pre-concepts are never perceived as deceptive (mis-concepts) with respect to scientific concepts, but they are understood as equivalent sources in construction of teaching. Didactic re-construction of these pre-concepts comes from the effort to create meaningful teaching and a research into learning.

The **patterns approach** in combination with other approaches according to particular year-classes is a base of integrated teaching at the Faculty of Education at Masaryk University in the programme “Biology for Life and Health”. During first and second years the patterns approach is supported by the environmental approach. It is further extended by applied science approach in the third year. So created approach is then combined with the thematic approach in the fourth year.

## What is the role of *integrated (thematic) teaching* (below ITT) in the new conception of teaching?

It is a teaching strategy, which is based on the teaching of one topic from views of several scientific disciplines. Integrated teaching units form in theory and also in practice a contradiction to fractionalized teaching in isolated courses (SKALKOVÁ, 1999).

INTEGRATED TEACHING is sometimes mistaken for PROJECT TEACHING and vice versa by pedagogical public. It differs in some substantial points: with project teaching the motivation should be inner, the topic should appear from the needs of pupils, elected methods and forms could be changed in the course of the work on the project. Attributes of integrated teaching:

- **the choice of topic** is determined **by a teacher** according to the continuation of curricula
- **region and its specialities** should be used for teaching the topic
- **motivation** is **outer**, elected by a teacher according to the age and interests of learners
- the choice of the **forms from social perspective** is upon a teacher; **group and collective teaching** with frequent **individual work** is used most often
- used **methods** should be of **action character** as much as possible and should use various information sources (observation, manipulation with objects/products of nature, work with a textbook/encyclopedia/map/atlas/field guides/internet, experiment)
- the choice of teaching tasks is **upon a teacher** and connected to educational targets of teaching; representation of **various scientific disciplines** (e.g. physics, chemistry, biology, geography, history) is important
- **summary of acquired knowledge accenting mutual connexions** and the **application of learned knowledge and skills** for everyday life should occur at the **conclusion**

Nevertheless, as is stated by Nezvalová and col. (2006), researches have showed that practically the approach to integrated teaching in (natural) sciences in the Czech Republic is mostly purely instructive – characterised by dominant position of a teacher and receptive passivity of pupils (students). It is reflected in current worldwide comparative researches on pupils' (students') knowledge.

Until 1995 (TIMSS 1995) the outputs of researches oriented to basic knowledge had placed the results of (natural) scientific education of pupils (students) in the Czech Republic highly above an average. While the pillars of education in Europe (DELACROS, 1996) and also the conception of teaching have changed, the results of countries having incorporated critical thinking, integrated scientific approach and constructivist view at learning into their educational systems prove to be better than ours at present. Researches are presently aimed, in spirit of the accepted reform of education (White Book of the European Commission, 1995), at investigating abilities to use knowledge practically, integrate it and use it correctly in decision making process (TIMSS 1999,



PISA 2003). The worsened results of Czech pupils (students) express that scientific knowledge is acquired in teaching in a form that precludes its further application and usage. Thus, in the comparison of scientific literacies (TIMSS 1995-1999) the Czech pupils (students) have worsened in all parameters on an international scale. It showed that they cannot use their knowledge in concrete situations, because they are not able to recognize its relation to reality. They are not able to transpose their abstract knowledge into a real situation (TIMSS, 2001). The second fundamental question of our project emerges from that fact:

**Are the student-teachers able to understand changes in the conception of education, to develop active learning and teaching, to use activating methods, if they are educated mostly transmissively for their whole lives?**

**Field integrated teaching** is one way (which current instructive pedagogical practice uses) how to acquire active knowledge in integrated teaching by constructivist approach. Classical teaching is in nature supplemented with teaching about selected (natural) scientific problems. A pupil (student-teacher) realises integrated teaching in concrete situations. He/she learns with an expert in groups on the principle of self-reflection and social constructivism in a terrain. We talk about **situated** and also **authentic learning** and **model of open teaching**. About a **friendly, participative approach to subject matter** that helps to solve problems, results from a pupil's (student-teacher's) developmental needs and target capacities that should be cultivated. At first a pupil (student-teacher) connects new knowledge with his/her experiences, with his/her view on the world. Art of a teacher-professional lies in anticipating a sequence of connections between pupil's (student-teacher's) original construction of reality and scientific knowledge, which a student conceives as a state of expected disaccord. He/she solves and overcomes it by the way of trials and mistakes. We talk about an **experiment – action learning from experience and from mistake**.

A pupil (student-teacher) should not feel endangered in new environment. Mistake is not considered to be a reason for worse assessment, but as a source of new, re-constructed experience. It is not the achievement of pupils (student-teachers), but the change of their attitude leading to target competency what is assessed.

## **What is the state of quoted problems?**

The longterm project “Biology for Life and Health”, aimed at innovations in the education of teachers for scientific literacy, was prepared at specialised centre “Kejbaly” at the Faculty of Education at Masaryk University at Brno in 1995 – 2000. Research instruments were verified in 2000 – 2002. The programme “Biology for Life and Health” has been developing by action research since 2002. First students of the longitudinally monitored programme successfully terminated their studies in 2006/2007.

The department “Kejbaly”, which is today conceived as an educational centre of integrated field teaching for sustainable development (below SD) and life (below SL), is situated at the premises of new campus of Masaryk University. It is a part of the Department of Biology of the Faculty of Education at Masaryk University at Brno (<http://www.ped.muni.cz/wbio/>). This is where innovations based on pedago-

gical constructivism, integration and learning from experience started to be tested in study programmes preparing teachers in terrain in 2002. Tasks of the project “Biology for Life and Health” correspond with the outputs of research intent of the Faculty of Education at Masaryk University – “School and Health For the 21<sup>st</sup> Century”. Pedagogical workers of the “Kejbaly” centre – authors of the project, are its researcher (<http://www.ped.muni.cz/z21/>).

It shows that if we are to adjust educational system to the requirements of the 21<sup>st</sup> century global society on a worldwide scale as soon as possible, than the close cooperation of specialists at least at European level is necessary in order to meet the “*Recommendation of the European Commission on Lifelong Learning*” (2006). It is a type of teaching realised through “communication of pedagogical network”: participants – students and pedagogues (departments of biology, physics, chemistry, geography, history, pedagogy and psychology, didactists of the disciplines, lecturers from domestic faculties and experts from abroad) solve together concrete educational situations and various theoretical and practical problems during several semesters. Students are actively engaged in the research.

If the teaching according to the new conception of education is to be realised mainly by activising methods, than their training with student-teachers is necessary for scientific literacy.

**Activising teaching cannot be only studied, it must be experienced!**

That is why development of such experience is a part of the project; also in integrated way, through a system of group seminar works. They are concentrated on using activising methods, forms and strategies in teaching. They comprise the simplest examples of situational learning when training practical activities at a garden up to a student project of integrated teaching in educational terrain. The entire system was named “***Dynamic Model of Learning from Experience***” (JEDLIČKOVÁ, 2007).

## **Is the training of teachers for education in the 21<sup>st</sup> century changing?**

We suppose that student-teachers and also teachers (even in institutions educating teachers) accustomed mostly to ***transmissive teaching*** /transmission of a sum of pieces of knowledge and skills/ lack ***condition*** for acting in changed circumstances; they lack the needed ***experience for teaching!*** This supposition is verified by above mentioned researches (TIMSS, PISA) and also by results of our research on basic knowledge in the project from years 2005 and 2006 (JEDLIČKOVÁ, TYMRÁKOVÁ, 2006).

As is mentioned by Bilek (2006): researches into the integration in (natural) scientific fields are almost exclusively concentrated on cognitive element of students’ conceptions of phenomena – mainly on uncovering mis-concepts, that is wrong interpretations, conceptions or notions and on the possibilities of their change in desirable direction. Therefore individual steps in constructing the entire project “Biology for Life and Health”, its “*Dynymic Model of Learning from Experience*” and “*Student Pedagogical Project*” have been gradually presented and discussed with experts at a number of conferences in the Czech Republic as well as abroad. (See JEDLIČKOVÁ, HRADILOVÁ, TYMRÁKOVÁ, 2000 - 2006).

A primary school teacher greatly influences individual's scientific literacy. The integration of (natural) scientific subjects is an obvious task of a teacher at this stage of education and learning from experience is a condition for development of child's cognition. Grounding for active learning is formed. Therefore the first phase of our research in the project "Biology for Life and Health" is targeted at study programme for teachers for primary education, **at the programme "Biology for Life and Health"**:

Innovations in study programme Pedagogism for Elementary Schools, study field Pedagogism for the First Stage of Elementary School, have been developed and tested in an action research for five years at the Faculty of Education at Masaryk University. The basic subject matter about nature and society is integrated in the newly accredited programme.

In the course of the five years studies integrated lectures (integrated scientific base = ISB) is supplemented with a training of active learning and heuristic teaching in connected practicals. Knowledge (pieces of knowledge, skills, values) marked as basic by particular integrated fields is developed relatively separately at seminars in the bachelor's stage of studies. According to the needs of practice the preparation of a teacher for education continues in an "integrated" mode in the master's stage. That means as a united teaching prepared in co-operation of five departments. Practical culminates in a "Student Pedagogical Project" and in a week integrated teaching in Moravský kras. At field centre of the Faculty of Education of Masaryk University in Jedovnice group teaching with experts in terrain is interconnected with peer learning as a model.

Majority of "biological" practicals (title from the content of subject matter) take place in nature, where biology cannot be separated from physics, chemistry, geology, geography and even from history. Therefore the biological part of subject matter at practicals, predominantly at the specialised centre of environmental education "Kejbalý", is realised in "integrated" way and with didactics of participatory disciplines since the first semester. Group seminar theses verified in terrain = **learning from experience between student-teachers and pupils**, and ended by self-reflection – professional group analysis of results are the outputs of courses. We talk about the "*Dynamic model of learning from experience*" in the programme "*Biology for Life and Health*" of the same name project (JEDLIČKOVÁ, HRADILOVÁ, 2004).

ISB practicals in the programme, conceived on constructivist principles, run in **mastery learning system** adapted to higher education. Action teaching at practicals is supported by **e-learning** on the principle of self-reflection. Nevertheless, the resulting acquiring of didactic knowledge from concerned disciplines (often implicit) in seminar theses through students' activities with pupils is perceived as **learning from mistake** and **training of self-reflection**, usage of **action research** in pedagogical process and **self-perfection**. Research and international co-operation in the project "Biology for Life and Health" has been developing abroad as well, in Slovenia and Slovakia (JEDLIČKOVÁ, HRADILOVÁ, 2007).

Akční teorie studenta o učení v přírodě is gradually developed in compulsory and optional practicals of the programme "Biology for Life and Health".

### *Is professional knowledge base formed by action teaching, active learning and “Dynamic Model of Learning from Experience”?*

- First year is started with the simplest model in which students process information – “Use of ICT for teaching”. They get to know with terrain with the help of activating methods. They elaborate and assess theoretical preparations for their e-learning of ISB in the role of an observer and teacher’s assistant to be. At the end of the year they present their own drafts of didactic instruments.
- In the second year, already as teachers’ assistants, students realise microoutputs in various roles at exhibition “Colourful autumn” and in a “Hra na školství education” at a garden. Teaching is oriented to knowledge in terrain and trained practical activities and run as so called alternative practice with pupils and their pedagogues. In groups with pupils they test another seminar work “Tutorial” in connection with courses of common basics, ISB and technical practicals, at conclusion of the fourth semester. They test integrated thematic teaching together with experts in this model of learning from experience (designed by students of combined studies) in activating environment by the help of their own or adjusted didactic instruments. Autoregulation is realised by videorecording and lecturer’s help.
- In the third year, in the role of teacher’s assistant-manager, students prepare exhibition “Colourful autumn” of their seminar works. It is attended by more than 1.500 visitors every year. This is where learning from experience is in progress again through alternative practice (group work with pupils and their pedagogues). Ve specializaci skupiny realizují a analyzují vlastní výukový program.
- In the fourth year, again in the form of group work (15-20 students in roles of workers participating in education and of beginning researchers), they manage demanding group integrated thematic or project teaching – “Student pedagogical project” at schools. They undergo a regional practical with peer learning at the end of semester.
- Students engage in solving research project of the centre or realise so called “clinical semester” at a partnership university abroad in the fifth year. The mentioned outputs are verified in longitudinal research since 2002; by an international team at present (See works of JEDLIČKOVÁ, HRADILOVÁ, TYM- RÁKOVÁ, 2000 – 2006).

### **What are present conditions of research of the presented student project?**

In the fourth year in winter semester students get to know, in connection with a sphere Human and the World of Work and interdisciplinary themes, specificity of educational area Human and his/her world in Framework educational programmes and methods used when teaching this educational area in courses Didactics for ISB and Practical of didactics for ISB 1. Above mentioned departmentst participate in the teaching in an integrated way. Students elaborate individually three preparations for

classical teaching in their seminar theses one of which is realised during their pedagogical practice at primary school.

Spring semester is then devoted to “Student Pedagogical Project” within the frame of compulsory course Practical for integrated scientific base 2. This where students try to answer the question: **How should we teach a given topic to pupils of different ages at various types of schools environmentally with the help of integrated (thematic) teaching in primary education?**

Students of full-time study mode prepare and realise an elected topic (Water 2006, Soil 2007), proposed to them by particular departments, at various types of primary schools in the course of entire semester. Then they analyse the teaching and present the results of the group seminar thesis at student conferences and in Information System of Masaryk University.

Students of combined study mode prepare integrated teaching for pupils of different ages, based on themes offered to them by particular departments, in smaller groups because of time reasons; preparations are presented and analysed at concluding meeting. Verification of the integrated thematic teaching (below ITT) in their own practice is optional.

“Student Pedagogical Project” was experimentally realised at the Faculty of Education at Masaryk University at Brno for the first time as a part of the “Dynamic Model of Learning from Experience” in 2006 (JEDLIČKOVÁ, TYMRÁKOVÁ, 2007). It is the output of the integration of teaching about nature and society in all the dimensions of the term **integration**. It represents the realisation of theoretic integrated technical part of student-teachers’ preparation (see integrated scientific base – ISB) in teaching at various types of schools.

Student-teachers use strategy of ITT on a given topic in the form of group seminar theses while teaching at schools with the integration of pupils. Students work in large groups while preparing and realising the teaching. Each pair of students performs a certain role in the group – methodists (prepare introduction and conclusion of teaching, including research of pre-concepts and effectiveness of teaching), specialists of study fields, managers, documentarists and inspectors. The following types of schools were selected for acquiring experience in the project: middle-sized city school (community school at housing estate), small-sized village school, sport school with programme Healthy school, international school (teaching in English), school with majority of pupils of Romany origin, classical school, but with an integrated teaching at first grade, waldorf school.

In groups all students of a year-class (cca 100) and all departments engaged in integrated teaching about nature and society participate in one student project on activating integrated teaching at various types of schools with integrated pupils in the course of a semester. Therefore it can be said that a year-class student pedagogical project represents also the integration of higher education (ITT on a given topic), students’ seminar theses and an alternative form of pedagogical practice (ITT at schools).

# What are students' opinions on the new conception of integrated teaching at the Faculty of Education of Masaryk University at Brno?

**Questionnaire: Answers of students if the fourth year NŠ – study mode: full-time: combined:**

## **1) I MET integrated conception of teaching (one topic viewed from perspectives of different disciplines):**

a) for the first time.....	14 students	20,9 %	8 students	12,3 %
b) have only heard of it .....	38 students	56,7 %	21 students	32,2 %
c) have tried it practically .....	15 students	22,4 %	35 students	54,0 %
d) include it regularly in my teaching.....	0 student	0 %	1 student	1,5 %

## **2) I consider INTEGRATED TEACHING ON A GIVEN TOPIC TO BE ...**

a) suitable.....	67 students	100 %	65 students	100 %
b) unsuitable.....	0 student	0 %	0 student	0 %

because... – it connects pieces of knowledge of particular subjects, pupils become aware of integrity and connexions, interconnection of the world, – it enables pupils to gain more information about a topic, they work with interesting aids, – it is better in motivating pupils, all pupils are active, they co-operate in groups, – it is more effective, pupils understand a topic in a better way, they assume a topic in a better way – it creates a positive relation to nature,

## **3) I would ... the INCLUSION of ITT into the courses of educational area Human and his/her world.**

a) recommend.....	67 students	100 %	65 students	100 %
b) not recommended .....	0 student	0 %	0 student	0 %

because... – teaching is more interesting, motivating, – interconnects pieces of knowledge, – does not develop encyclopedical knowledge, but develops understanding and connexions, – teaches to work with different sources of information, – develops co-operation among pupils – complex development of knowledge and skills, – develops the entire personality of a pupil – develops key competences

## **4) Topic “SOIL” is for integrated teaching in my opinion ...**

a) suitable.....	66 students	98,5 %	65 students	100 %
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because... – soil is close to pupils all around us, – it touches all disciplines, pupils are not aware of its importance, – topic is neglected, – it is a fundamental condition of life, – possibility to research, experiment

b) unsuitable.....	1 student	1,5 %	0 student	0 %
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because... – it is difficult to find activities for it

**5) Own PREPARATION of integrated teaching on a given topic is in my opinion...**

a) too demanding.....	<b>1 student</b>	<b>1,5 %</b>	<b>1 student</b>	<b>1,5 %</b>
because... - it is too demanding				
b) demanding, but feasible.....	<b>64 students</b>	<b>95,5 %</b>	<b>62 students</b>	<b>95,5 %</b>
because... – time consuming preparation, aims of teaching must be precisely clarified, it must be well prepared to make sense, – organizational aspects are needed to be well thought out, all aids need not be available, – demanding on technical knowledge, – I must choose from lots of information, - it requires co-operation with colleagues,				
c) feasible .....	<b>2 students</b>	<b>3 %</b>	<b>2 students</b>	<b>3 %</b>
because... – but time consuming				
d) facile .....	<b>0 student</b>	<b>0 %</b>	<b>0 student</b>	<b>0 %</b>

**6) Own REALISATION of integrated teaching on a given topic is in my opinion...**

a) too demanding.....	<b>1 student</b>	<b>1,5 %</b>	<b>0 student</b>	<b>0 %</b>
b) demanding, but feasible.....	<b>42 students</b>	<b>62,7 %</b>	<b>36 students</b>	<b>55,4 %</b>
because... – it needs to be prepared, then it works, - pupils must get accustomed to new approach at first, – we struggle against the lack of time, space and equipment, – other teachers get involved in realisation, – pupils' parents and siblings can get involved				
c) Feasible .....	<b>23 students</b>	<b>34,3 %</b>	<b>28 students</b>	<b>43,1 %</b>
because... – I can involve other teachers in realisation, eventually pupils, – it involves all pupils, – it is prepared precisely for the needs of my pupils, – activities are attractive for pupils, – it is grounded by good preparation, – it is less demanding than the preparation,				
d) facile .....	<b>1 student</b>	<b>1,5 %</b>	<b>2 students</b>	<b>3 %</b>
because... – provided it is properly thought out and prepared				

**7) I would ... in integrated teaching in my own pedagogical practice (more than one question possible!!!!).**

a) never embark.....	<b>0 student</b>	<b>0 %</b>	<b>0 student</b>	<b>0 %</b>
b) embark by myself .....	<b>40 student</b>	<b>59,7 %</b>	<b>22 students</b>	<b>33,8 %</b>
c) embark with the help of my colleagues teaching the same year-class .....	<b>56 students</b>	<b>83,6 %</b>	<b>42 students</b>	<b>64,6 %</b>
d) embark with the help of my colleagues teaching at the first stage.....	<b>37 students</b>	<b>55,2 %</b>	<b>40 students</b>	<b>61,5 %</b>
e) embark with the help of colleagues from the whole schoo.....	<b>27 students</b>	<b>40,3 %</b>	<b>41 students</b>	<b>63,1 %</b>

**8) I consider it suitable to... integrated teaching on a given topic (more than one answer possible!!!!).**

Answered only by students of combined study mode

- a) conceive and prepare by myself precisely

according to the needs of my pupils .....	<b>23 students</b>	<b>35,4 %</b>
b) adjust in accordance with appropriate methodical materials according to the needs of my pupils .....	<b>60 students</b>	<b>92,3 %</b>
c) teach precisely according to appropriate methodical materials .....	<b>2 students</b>	<b>3 %</b>
d) to invite specialists in school who would prepare and teach programme according to the needs of pupils .....	<b>15 students</b>	<b>23,1 %</b>
e) to visit an alternative educational institution with my pupils, where a standard programme on a given topic would be taught to my pupils.....	<b>37 students</b>	<b>56,9 %</b>

## Conclusion

We see the source of new conception of teaching for assuring scientific literacy in the system of active integrated situational learning about nature and society; in nature and through activating methods in study programme of student-teachers. We try to create space for individualized teaching by friendly approach to subject matter. With the support of team co-operation of specialists from integrated departments, including foreign partners, by the way of learning from experience and peer learning experience base of teaching should be generated. We suppose on the base of new understanding of the concept of teaching that by means of especially lead situational peer learning, realised in cooperation with a didactist, the development of experience occurs. These are conceived as a ground for creation of competences for lifelong education and pedagogical competences important for development of a teacher-professional. We perceived the process as a presupposition, a first grade, for the professionalisation of teachers required by society. The Programme “Biology for Life and Health”, of which the “Dynamic Model of Learning from Experience” is a part, aims by the help of learning from experience to improve the quality of teaching, increase professional skills of student-teachers, change students’ attitudes to the profession of a teacher and mainly develop positively the attitudes to the protection of nature and to human health as well as to health of society.

## ZKUŠENOSTNÍ UČENÍ A ZNALOSTNÍ ZÁKLAD VYUČOVÁNÍ

### Studentský pedagogický projekt ve vzdělávání učitelů primární školy

*Akční výzkum a testování výukových modelů*

**Abstrakt:** Případová studie prezentuje část výzkumu, zabývající se implementací zkušenostního učení jako základu znalostní báze učitelů v integrovaném didaktickém přírodovědném kurzu ve studijním programu Učitelství pro primární vzdělávání. Je součástí projektu „Biologie pro život a zdraví“, který umožňuje získávání zkušeností a osobnostní rozvoj studentů i pedagogů na partnerských školách, ale také 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, kde se klade 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.

**Klíčová slova:** akční výzkum, zkušenostní učení, prekoncepty, kritické myšlení, reflexe, osobnostní rozvoj, učitelské dovednosti, dovednost reflexe, longitudinální výzkum