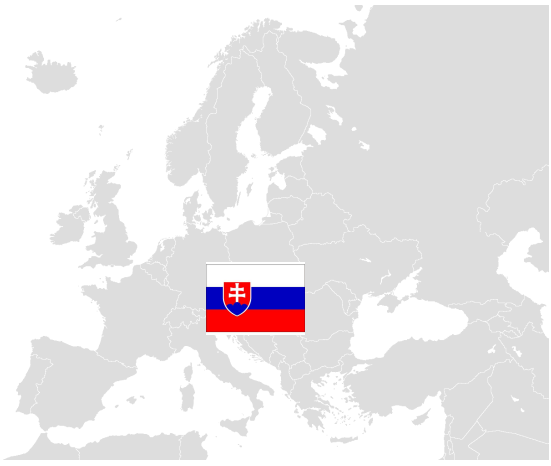
TRANSFER Slovensko®
spol. s r. o.
Centrum vzdelávania manažérov

518300-LLP-2011-IT-COMENIUS-CNW

Chemistry Teachers' Training in Slovakia



Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

518300-LLP-2011-IT-COMENIUS-CNW

Chemistry Teachers' Training in Slovakia

KATARÍNA JAVOROVÁ
Department of Didactics in Science, Psychology and Pedagogy, Faculty of Natural Sciences,
Comenius University in Bratislava
TRANSFER SLOVENSKO, S.R.O
(SLOVAKIA)
DUBRAVA@TRANSFER.SK

ABSTRACT

National Situation Report contains basic information about the situation in preparation of students of universities who study the profession of a teacher of chemistry. This report contains also information about the preparation of current teachers of chemistry at basic schools and high schools. There are named main problems in preparation of future teachers resulting from the current situation in teaching of scientific subjects. In part of initial teacher training we provide an overview of universities which prepare future teachers and in the part in-service teacher training we provide an overview of national projects which have been implemented at Slovakia in last 5 years and whose aim was to prepare future teachers of chemistry and also current teachers of chemistry at basic schools and high schools for modern, open, flexible and good system of educating. There are also named the main problems and barriers in preparation of future teachers and the problems of currents teachers of chemistry in teaching, attitude of students at universities towards chemistry and about the possibilities of solving them. We provide also results of workshop of teachers and experts in chemistry, their opinions at the state of teaching of chemistry at Slovakia from the point of preparation of future teachers.

1. National Situation on Teacher Training

1.1 Initial Teacher Training

Ongoing reform on increasing the quality of school system in Slovakia was reduced by creation of school law and resulting creation of state and school educational programs without involving the most important part – teachers, employers of graduate institutes and universities. The Science subjects as Physics, Chemistry, Biology, Math and Geography are not the favorite ones and students classify them as difficult. They do not choose them for their future study. The main problem for experimental sciences is retreat from experiments at elementary and high schools, decreasing amount of hours of teaching scientific subjects and missing laboratories at most of the schools. In the past 20 years the problem has been growing and there are also good teachers of scientific subjects missing both at elementary and high schools. There is also missing interest of young people to study and be employed as teachers. The top factor which influences working of scholar system is the quality of its teachers. Inferior teacher cannot provide good education even when all of the conditions for teaching are provided. On the contrary, a good teacher can compensate worse conditions of educational process. Modern educated teacher is a cure for healing the Slovak educational system (National Report on Motivation). Education in Slovakia is dependent on the level of teachers, quality of preparation at the universities but mainly on providing conditions for professional and personal development of a teacher. Vocational schools and conservatories (teachers in preschools, educators, teachers in artistic schools) have in competition providing good selection and preparation for the teacher work. There are 11 universities in Slovakia, which prepare future teachers at the bachelor level BSc. and master level Mgr. From those 7 universities prepare future teachers of chemistry for ISCED 2 and ISCED 3 mainly at scientific faculties (UK Bratislava, UKF Nitra, UMB Banská Bystrica, UPJŠ Košic) and pedagogical faculties (TU Trnava, KU Ružomberok, UJŠ Komárno – only BSc. level). Study programs of each university differ even though there are perennial efforts for an uniform attitude in preparation of the scientific teachers.

It is needed to say that there is insufficient amount of applicants for studying teaching, mainly in scientific subjects. Almost half of the applicants come from grammar schools, the rest from vocational

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

schools but also from secondary vocational schools, those are mainly students who got only average or below average results or they consider studying of teaching as something temporary because they were not successfully admitted to non-teaching subjects departments.
For the improvement of the selection of applicants for the job of a teacher and their preparation it is needed to increase attractivity of teaching. In the process of selection it is needed to focus on the most successful students of high schools, work out the professional standards and improve the preparation for teaching, provide sufficient pedagogical practice at training schools (average duration of pedagogical practice in Slovakia is 6 weeks (1 approbation subject during their study).

1.2 In-service Teacher Training

At the Faculty of Natural Sciences of UK in Bratislava there is the Department of Natural Sciences, Psychology and Education which prepares future teachers. It is the creator and leader in many national and international projects since 1999, for example Infovek (www.infovek.sk), COMENIUS, RAFT, MVP ZŠ and MVP SŠ (www.modernizaciavzdelavania.sk). In these projects are applied experiences and results from researches and are used in innovative preparation of teachers of Chemistry, Biology, Geography and Environmental Education. The department gradually offers students new optional subjects in which they can spread their portfolio of knowledge but also can gain new competences in teaching. Those are, for example, The Art of Presentation and Communication, Activating Methods and their Use in Teaching, Tools of Motivation in Teaching Chemistry and optional subjects focused on work with digital technologies – Work with Interactive Board, Didactic Software for Teaching Science Subjects, Mobile Science Education, Creation of Web Pages and other optional subjects. Other faculties also try to improve the study by involving attractive subjects into their curricula.
On the basis of years of experiences from the work on the national projects (Infovek, Modernizácia vzdelávania na ZŠ a SŠ, Moderný učiteľ, etc.) it was decided to work out the project for identification of innovative teachers of scientific subjects in Slovakia and connect the work of innovative teachers with preparation of future teachers of scientific subjects at the Faculty of Natural Sciences UK, Department of Education. That is how triennial project KEGA “Incubator of innovative teachers of scientific subjects at elementary and high schools” was created. The aim of this project was to create a database of teachers who create the basis of innovative teachers with whose help the reform of education “from below” will be implemented (new methods and forms of education with support of digital technologies) and also teachers education for improvement of creativity at schools. It is also needed to implement inevitable change in preparation of future teachers of scientific subjects at the universities.
For fulfilling of the aims of Incubator of innovative teachers it is needed to:

- Identify innovative teachers of scientific subjects
- Analyze didactic performance of innovative teachers and create a database of innovative teachers of scientific subjects, which will present a mass of innovative teachers at the level of elementary schools and high schools in Slovakia
- connect the work of innovative teachers with the preparation of future teachers of scientific subjects at the universities and create a system of “Innovative Semesters of Science Didactics” where seminars, workshops of innovative education, creative discussions and closer cooperation of Bsc. students and Mgr. students with innovative teachers will take place
- Create a webpage of the project where the work of innovative teachers will be presented (performances from the Innovative Semesters of Science Didactics, photo and video documentations of the project and other innovative activities of the Department of Natural Sciences, Psychology and Education Faculty of Natural Sciences, UK.
- In the final year of the project (2014) it is our aim to work out a publication which should be involved in basic bibliography for the university preparation of future teachers of scientific subjects and for education of teachers, for the need of implementing innovative and creative forms of work at elementary schools and high schools.

The selection of innovative teachers of scientific subjects started in 2012 at the basis of cooperation with teachers during many national projects and also at the basis of analyzing the performances of

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

teachers from various projects and competitions focused on modernization of education. The database is continuously renewed.

During the winter semester of the academic year 2012/2013 was during the period of time from September to December realized **"1. Innovative Semester of Teaching Science Education in Chemistry, Biology and Geography for future teachers as well as for teaching subjects and psychology".** Eight innovative teachers were leading in winter semester together eight lectures, six seminars and three workshops. There were invited two teachers for each subject. Innovative teachers discussed the progress and the scenario of their activities connected with bachelor and master program of teacher training. From activities of each innovative teachers the didactic materials, video of the activity, short interesting videos and photo documentation were chosen.

During the summer semester took place **"2. Innovative Semester of Teaching Science Education in Chemistry, Biology and Geography for future teachers as well as for teaching subjects and psychology"**. Nine innovative teachers were invited. They led nine lectures, seven seminars and one workshop. There were again created innovative methodic materials, photo and video documentations. All the performances are at the portal: http://inkubatorucitelov.eskola.sk/. Evaluated students invited innovative teachers after each innovative semester. Their reactions were very positive. It is useful to point out the interesting trends which turned out during happening of the innovative semesters:

1. change of a teacher resulted in increased interest of students for lectures and seminars
2. students were more active and they got involved in activities of innovative teachers
3. many of the presented topics and activities were new for the students, for example, digital competencies of a teacher, creation of tasks for leading of cognitive process of students etc.
4. some of the activities were difficult for students and they asked for another workshops
5. students did not have experiences with innovative teachers and appreciated their work
6. many students who were not decided whether they will go to teach after finishing their degree were positively motivated by innovative teachers
7. students appreciated the ability to gain materials from innovative teachers

In addition to didactics of science there were invited teachers who presented alternative scholar systems and methods of work in it. Students were interested in presentations of Dalton, Waldorf and Montessori schools and about their principles and ways of pedagogical diagnosis.

"3.Innovative Semester" will be realized during the winter semester of the academic year 2013/2014. Each faculty preparing future teachers has its own courses, optional subjects. The Faculty of Natural Sciences was chosen because it belongs to the partner network of the project Chemistry Network…

One of the main criterions of attractivity of being a teacher is the existence of career system. Slovakia has a system of professional development of pedagogical and vocational employees in the career system (Law n.390/2011 Z. z., which is changed and supplemented by Law n 317/2009 Z. z. about pedagogical and vocational employees). The main problem of the current system is absence of professional standards which are used in other countries. Experiences with education – professional development of pedagogical and vocational employees are rather negative than positive. Teachers educate themselves at various accredited courses, they gain points followed by an increased salary. Educative courses can be organized by the universities and by methodological and pedagogical centers, educational institutions (state or private) etc., but the quality of these courses is questionable. In 2013 teachers could attend dozens of accredited courses (refresher, specialized, innovative, etc.) but the predominant are courses focused on coping with the work with digital technologies. Nowadays, the digital technologies are an inherent part of our daily life. Demand for these courses is so high because the technologies are involved not only in common life of students but also their teachers. Terms as modernization of a school and modernization of education mean for public and teachers equipping the schools with modern digital technologies and of course using them in the teaching process. However, integration of digital technologies into education should be connected also with new methods and forms of work and this is sometimes forgotten. National projects such as "Modernization of Education System at Elementary Schools" (MVP ZŠ) and "Modernization of Education System at High Schools" (MVP SŠ) were mentioned in the previous report. Aim of those projects is to change form of teaching at schools, which will lead to modernization by incorporating modern technologies into teaching connected with preparation of the teachers for active realization of

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

the school reform by adapting educational system to the needs of the society. Projects are focused on innovation and modernization of the content of education and methods in teaching, but mainly on the preparation of teachers with new competences for a work in the Modern school of the 21. century (less memorizing for students, more interesting lessons, better possibilities for self-realization for the teachers and a new system of the career development). Target groups of those projects were teachers of elementary schools and high schools from Slovak Republic, who teach at least one of these subjects: Math, Physics, Chemistry, Biology, Slovak Language, History, Geography, Music and Art. There were created 20 publications for these teachers which cover the whole project issue beginning with digital literacy through modern didactic technique to using of technologies in teaching. For teachers of scientific subjects (Chemistry, Biology, Geography) there were created methodic materials which consist of specific suggestions for involving digital technologies into their teaching plans. In the study material for chemistry teachers for elementary schools are presented options of using innovative methods in teaching chemistry, suggestions and illustrations of project teaching, experiments with the support of digital technologies, special software for chemists, examples of using the portal Planet of Knowledge, interactive board and examples of developing key competencies. Last chapter is dedicated to new ways of evaluation of the students. Similar study plan for the high school teachers consists of illustrations of lessons using DT, portal Planet of Knowledge, interactive board, project teaching, special software for chemists computer supported experiment and e-learning environment. In the course the teachers of chemistry gained practical skills with digital technologies and software and they got chance to implement them into their teaching. Teachers were educated in three modules with the length of 106 lessons divided into the part which required their presence at the course and distance learning. The presence part consisted of meetings with professional lectors in training center equipped with needed digital technologies. There were created 20 training centers for the needs of projects MVP in Slovakia. Teachers completed also distance learning by e-learning system of the project (www.modernizacia vzdelavania.sk). In December 2012 this part was finished. Overview of finishing the education according to years and modules is shown in graphs 1 and 2.

Graph 1 *Overview of teachers of elementary schools who finished their education according to years and modules (source: MVP, 2010)*

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Graf 2 *Overview of teachers of high schools who finished their education according to years and modules (source: MVP, 2010)*

For the subjects of Biology, Chemistry and Geography there were present 1769 teachers of elementary schools and high schools (attending at least one module). 1599 teachers representing 90,39% also successfully graduated. Current amount of active teachers who successfully graduated and kept active in the project is 1570 teachers, which is 88,75%. After graduation from all modules and delivering on-line activities, there follows the last phase – writing of a final report. Topics were created by teams of professionals for each subject. Teachers could choose a type of the final report:

- Research,
- Didactic project,
- Qualified suggestion of teaching aid on the basis of ICT with the suggestion of the use.

Teachers who successfully completed the educational project graduated in the specialized education (Law 317/2009 about pedagogical and vocational employees) and they were given 35 credits. The actual amount of teachers of subjects of Biology, Chemistry and Geography who successfully graduated at the final meeting connected with the advocacy of the final work is 1163 which is 74,07% from the total amount of participants. National projects MVP ZŠ and MVP SŠ belong to the biggest educational projects which have been realized in the last 5 years in Slovakia and affected thousands of teachers. Department of Education plans to ask graduates of those projects in the subject of chemistry for the feedback – how they perceive the training after some time, what they use in the lessons from the trainings, which technologies they use.

The Faculty of Natural Sciences UKF in Nitra prepared an educational program for the chemistry teachers named Chemistry in Practice within the project PRIMAS which aims to support integration of revelatory teaching (IBL) into teaching Math and scientific subjects. There were 24 teachers present at the first training. The range of the education was 60 lessons (http://www.primas.ukf.sk/index.html). The education consisted of lectures, seminars, practical exercises in the topics of Chemistry of Plastics and Chemistry of Daily Life (cosmetic chemistry, chemistry in food, chemistry in cleaning).

2. Main barriers in preparation of future chemistry teachers and practice of the teachers

Presence of good teachers (connected with the preparation of future teachers) at schools is dependent on two factors: good selection of applicants who possess an interest for a job in education and their preparation before starting working along with providing opportunities for further improvement while teaching (continual education). From those factors result the need of change in the system, providing of a good selection and preparation for the work in education. It is inevitable to increase attractivity of the teaching job (from the financial point of view), provide a good selection of applicants and orientate on the best graduates of high schools, work out professional standards for beginning teachers and improve the quality of preparation for teaching (so that graduates will be able

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

to provide educative process in the harmony with ŠVP of the certain kind of school and education. It means that preparation of future teachers for elementary schools has to have different pedagogical – psychological preparation than the preparation of teachers for high schools. It is advisable to provide more practical teaching in preparation of future teachers and provide higher difficulty for studying teaching. After completing the graduating preparation provide another professional development and growth. For improving the professional growth it is needed to toughen the process of accreditation of programs of continual education and to provide feedback from the previous participants of education, toughen the requirements for professional grants and provide the control of quality and progress of the programs of continual education. From TALIS 2008 study results that Slovakia belongs to countries with the highest amount of highly qualified teachers who do not continue in another continual education.

We consider the main problems in preparation of future teachers to be that there is not a unified way of preparation, the big amount of faculties, which prepare future teachers; dividing of the study at BSc. and Mgr. degree (the implementation of BSc. graduates is not provided); little amount of practical education (pedagogical practice); small connection between practice and theory; disinterest for studying teaching and not enough applicants.

The main problem in preparation and education of teachers is implementing the credit system because teachers want to gain credits but they are not interested in professional growth and improving educative process. There is also an insufficient offer of the further education.

3. Workshop

This was the second from the three project workshops. We managed to provide presence of one expert. With the other experts and teachers involved we had another workshop. At this workshop there were formulated presented notices and suggestions. At the beginning the atmosphere was rather tense because there was a short fail of technics (webcam stopped working). We would like to emphasize that nowadays it is really difficult to convince teachers for this type of cooperation. Everyone has a lot of work and they are also involved in various types of national and international projects. Financial motivation is minimal, so when they agree on some cooperation to benefit their work it should be clearly stated. Another problem is that teachers do not know English, so some of the information on the web page is less available for them. This does not apply to experts, who have more time issue because they are involved mainly in international projects

In this workshop participated five teachers and two experts. Workshop took place in the space of the new educational center HITACHI at the Faculty of Natural Science of UK. Doc. Brestenská introduced aims of the educational center and invited people who present at the conference: The Magic of Science Begins in a School (Natural Sciences in Slovak School System and their Future), which will be at the end of June at the Faculty of Natural Science of UK. Discussion about preparation of future teachers and teachers of chemistry unfolded from one basic starting point: importance of good preparation of future teachers and of the lifetime education for teachers. It was emphasized that without a good teacher there cannot be a good scholar system.

Another topic of the workshop included available courses for teachers of chemistry. There is a big offer of accredited courses of continual education. Doc. Brestenská stated that their quality is questionable. She said that everything depends on the quality of the lecturer, who leads the course. She also remarked that many times teachers are interested only in credits they gain also without taking part in a course (it is enough to pay the fee for the course). Teachers present and Mgr. Javorová, PhD. stated that they also have experiences with teachers who were not interested in courses. They also agreed that they have experiences with the courses where it is enough to write only an essay.

Another topic was preparation of students of chemistry for teaching at the Faculty of Natural Sciences. At this faculty is a relatively big Department of Didactic in Science. From this department were present Doc. Brestenská and Mgr. Javorová, PhD. who are experts in national project Modernization of educational process. They are both dealing with preparation of future teachers and with educating of teachers and with problems connected to it. Doc. Brestenská is involved in many European projects as well. According to her, the biggest problem in preparation of the future teachers is a complex of many other factors:

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

- quality of applicants
- absence of good textbooks of didactic for natural sciences
- good pedagogical practice during study (absence of enough teachers and schools)
- inner motivation of the students
- sufficient offer of appropriate optional subjects

Doc. Brestenská introduced the project Incubator of Innovative Teachers of Scientific Subjects and presented results reached and also her experiences from the two innovative semesters. She emphasized that it would be appropriate to continue in cooperation with innovative teachers after finishing the project.

At the end of the workshop, manager of the project Juraj Dúbrava thanked to everyone present for a very good discussion and added that he is looking forward to the next cooperation.

4. Conclusions

Society nowadays requires active, innovative and creative teachers who need to educate themselves more in order to be like this. The reform of education is an ongoing and difficult process which needs to be realized as a vision connected with the innovative processes from below. It means with the support of innovative teachers at schools. In accordance with the law about pedagogical and vocational employees as well as in accordance with the edict about continual education is realized post gradual education of the teachers. After a successful graduation from the courses teachers earn credits which entitle them to qualification progress with higher financial evaluation or entitle them to do attestations, etc. Teachers can be educated in many projects (financed by EU) in many educational institutions, methodological centers and various organizations which offer accredited educational courses. The question is whether the courses are good, whether the teacher learns something he can use in his pedagogical practice. Schools have bought expensive digital technology – computers, interactive boards, visualizers, voting machines, measuring machines for experimental activities and many times a teacher does not know how to work with them and how to use them in educational process. On the basis of this teachers choose courses which are focused only at technical side but not at didactic application into educational process. Interactive board is many times used as an expensive screen on which videos and Power Point presentations are projected. Teachers do not know how to work with the program and how to create educational materials in them. It is the same with the measuring machines which are great for experimental activity of the students but are also very expensive. If we want to have modern and flexible system of education which will guarantee quality and efficiency, then it is needed to rethink previous strategies of changes. It is needed to establish professional standards for teachers. Major impact on results of the students has the quality of education and learning which is provided by a specific teacher. If we want to have good teachers it is needed to start in pre gradual preparation of pedagogical employees and continue in good continual education.

Bibliography and References

http://inkubatorucitelov.eskola.sk/. (2013). Cit. 14. 6 2013. Available online: Teachers' incubator.

http://modernizaciavzdelavania.sk/. (2013) Cit. 20.6.2013) Available online.

http://www.primas.ukf.sk/index.html (2013). Cit. 30.6.2013). Available online.

Brestenská, B. (2007). Od Homo sapiens k Homo mobilis - od učiteľa nalievača vedomostí k učiteľovi manažérovi procesu vzdelávania. Aktuálne trendy vo vyučovaní prírodovedných predmetov (s. 31-34). Bratislava: Univerzita Komenského.

Brestenská, B., & kolektív., a. (2010). Premena školy s využitím informačných a komunikačných technológií. Využitie IKT v danom predmete, spoločná časť. Košice: ÚIPŠ, elfa, s.r.o.

Hrašková, S., & Brestenská, B. (2011). Komparácia modelov rozvíjania a hodnotenia digitálnych kompetencií učiteľa. Biológia, ekológia, chémia, 15(3), 2-6.

Križanová, M., & Brestenská, B. (2011). Premena učiteľa z pohľadu učiteľa. Biológia, ekológia, chémia, 15(4), 4-6.

Správa o stave školstva na Slovensku. Príloha - Učiteľské noviny 17-21/2013.

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Hrubiškova, H., Hyžova, D., Pravňanova, A. Učebna motivacia študentov gymnazia pri štúdiu predmetu biologia a jej intuitivna diagnostika učiteľom. In Aktuálne trendy vo vyučovaní prírodovedných predmetov. Zbornik prispevkov z konferencie s medzinarodnou učasťou Scien Edu. Bratislava: Univerzita Komenskeho v Bratislave, Prirodovedecka fakulta, 2007, s. 205–208.
Hrubiškova, H., Gorčikova, M., Hyžova, D. Postoje a štruktura učebnej motivacie študentov gymnazia v predmetoch biologia a chemia. Pedagogické spektrum, 2008, roč. 17, č. 2. In press.
Javorová, K. a. (2010). Využitie informačných a komunikačných technológií v predmete Chémia pre základné školy, učebný materiál - modul 3. Košice: elfa, s.r.o.
Javorová, K., Brestenská, B., & Križanová, M. (2011). Vzdelávanie učiteľov chémie pre digitálnu školu. Media4u Magazine , 8 (X3), 156-162.
Nagy, T., Brestenska, B. Nove smerovanie pripravy učiteľov prirodovednych predmetov na praci v IKT. Informatika v škole, 2001, č. 22, s. 24–30.
Petlak, E. Nove trendy vo vyučovani. Pedagogické rozhľady, 2008, roč. 17, č. 1, s. 1–2.
PISA 2006, Slovensko. Národná správa. Bratislava: Štatny pedagogicky ustav, 2007.
Poonan, C. D. Intrinsic motivation and academic achievement. Remedial and Special Education, 1977, roč. 18, č. 1, s. 12–19.
Silny, P. Sučasne problemy vyučovania chemie v zakladnych školach a gymnaziach. Biológia, ekológia, chémia, 1996, roč. 1, č. 1, s. 2–5.
Slavin, R. E. Educational Psychology. Theory and Practice, 7. vyd. Boston: Allyn and Bacon, 2003.
Veselsky, M. Postoje a pripomienky žiakov 1. ročnikov gymnazia, strednych odbornych škol a učilišť k obsahu učebneho predmetu chemia na zakladnej škole. Biológia, ekológia, chémia, 1997, roč. 2, č. 2, s. 24–25.
Veselsky, M. Prirodovedne predmety v zakladnej škole očami stredoškolakov. Pedagogická revue, 1998, roč. 9, č. 2, s. 127–134.
Veselsky, M. Zaujem žiakov o prirodovedne učebne predmety na zakladnej škole a hodnotenie ich doležitosti – z pohľadu žiakov 1. ročnika gymnazia. Psychologica, Zbornik Filozofickej fakulty Univerzity Komenskeho, 1999, roč. 37, s. 79–86.
Veselsky, M. Praca s počitačom ako vyznamny motivačny zdroj učenia žiakov. Biológia, ekológia, chémia, 2003, roč. 8, č. 4, s. 7–9.
Veselsky, M. Mechanicke a zmysluplne učenie sa – sposoby ich uľahčenia. Pedagogická revue, 2004, roč. 56, č. 3, s. 225–241.
Veselsky, M. Pedagogická psychológia 2. Teória a prax. Bratislava: Univerzita Komenskeho Bratislava, 2008.
Veselsky, M., Krahulcova, D. Postoje študentov k využivaniu internetu na vyučovani.Technológia vzdelávania, 2007, roč. 15, č. 6, s. 4–7.
Veselsky, M., Tothova, A. Hodnotenie učebneho predmetu chemia študentmi gymnazia. Sborník prací Pedagogické fakulty Masarykovy univerzity č. 179. Řada přirodnich věd č. 24. Brno: Masarykova univerzita, 2004, s. 120–126.
Veselsky, M., Hrubiškova, H. Zajem žaků o učebni předmět chemie. Pedagogicka orientace 2009, roč. 19, č. 3, s. *45–64. ISSN 1211-4669.*

Lifelong Learning Programme

This project has been funded with support from the European Union.
This material reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.