

WLC 2016 : World LUMEN Congress. Logos Universality Mentality Education Novelty 2016 |  
LUMEN 15th Anniversary Edition

## Training Needs of Technology Teachers in the Context of Teacher's Competences Evaluation

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### Abstract

<http://dx.doi.org/10.15405/epsbs.2016.09.60>

The authors briefly describe a national research project “Evaluation of Teacher’s Competences”, carried out by Constantine the Philosopher University in Nitra, Slovakia since July 2015, which aim is to identify a general set of criteria and evaluation tools applicable for valuation of the quality level of the educational activities performed by teachers. In the context of this project the authors focus on problems arising out of the changes introduced by a curricular reform in the area of technology education at lower level of secondary schools in Slovakia. They concentrate on the identification of training needs of Technology teachers and evaluation of their professional competences. The partial results of research relevant to this field of interest are described and linked with Technology teacher’s answers from the interview survey conducted in six primary schools in the region chosen for the research. The interpretation of the gained data supported by the teacher’s comments on the current situation in teaching the Technology subject at schools is also presented. The main emphasis is put on those factors which influence teaching the subject of Technology, such as the credit system, subsequent financial reward for teachers, material and technical equipment of school workshops, introduction of topics which would significantly contribute to the development of teacher’s professional competences, and others. Both the advantages and disadvantages of continuing education stated by teachers, based on their own experience and opinions, are analysed, and the ways for the improvement of this kind of teacher training are recommended in the paper.

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**Keywords:** Technology education; professional competences of Technology teachers; training needs; continuing education; personal interview survey.



## **1. Introduction**

In Slovakia, career levels and career positions for teachers have been introduced by Act No 317/2009 coll. on the teaching staff and specialists (Act No. 317/2009), and this also includes a system of the continuing professional development of teachers. The aim of this law was to stimulate a teacher's career growth by a motivating salary system closely connected with their professional development and, at the same time, to stimulate the increase of education efficiency through the professional development of teachers, including a system of their competences evaluation. Professional standards should become a conceptual starting point of a teacher's professional development system. Though Act No 317/2009 coll. on the teaching staff and specialists refers to the professional standards, they have not been officially approved yet. Their development and design were a subject matter of two interconnected national projects "Professional and Career Growth of the Teaching Staff" co-financed by the European Union (MPC; Valica & Pavlov, 2011; Šnídlová, 2011).

In relation to these standards a research project titled "Evaluation of Teacher's Competences" has been carried out by Constantine the Philosopher University in Nitra as a national research project since July 2015. The project is financed by the Slovak Research and Development Agency (APVV – Agentúra na podporu vedy a výskumu), the national grant agency responsible for research and development promotion in all fields of research, including international research cooperation. The Agency acts as an institution for distribution of the public funds for research and development on a competitive basis in Slovakia. The above mentioned project is in the second year running, and its total duration is four years (1 July 2015 – 30 June 2019). Its main aim is to identify a general set of criteria and related evaluation tools applicable for valuation of quality and qualification of teacher's educational activities. The proposed evaluation concept of criteria and tools for teacher's evaluation will be interconnected with professional standards (professional competences), career levels and career positions stated in Act No 317/2009 coll. on the teaching staff and specialists and outlined in the national project "Professional and Career Growth of the Teaching Staff". Moreover, the focus of the project is closely joined with current social needs and the needs of improving pre-service teacher training and subsequent life-long in-service education of teachers (Garabiková, et. al., 2014; Procházka, 2012).

Partial results of the research show a significant relationship between formal training and the quality of teacher's teaching performance and learner's achievements (Goldhaber, Brewer, 2000). However, as it was broadly pronounced, pre-service teacher training is not sufficient to provide teacher trainees with the necessary knowledge and skills they would need to manage a variety of tasks and situations in their future professional career (Vítečková, 2014; ETUCE, 2008). An integral part of teacher evaluation issues is the self-evaluation of teachers, the right item which training needs of teachers can be derived from (Pisoňová & Nagyová, 2014). Professional development in general brings new challenges as well as problems which teachers have to cope with and manage. The curricular reform with its needs but also with some obstacles has been introduced in Slovakia after 2008 (Kozík & Škodová, 2008). The reform has negatively affected mainly Technology teachers (Kozík, 2014; Pavelka, 2011).

Most of the recent research on the qualities needed by a teacher and their impact on learner's achievements have been driven by debates about whether teaching should be considered and promoted

as a profession, or whether it should be deregulated and open to people without formal teacher training (Garabiková, et. al., 2014; Procházka, 2012; Darling-Hammond, Youngs, 2002). On the other hand, the assignment of teachers to subjects and curricula topics in which they obtained qualification within their formal training is rather important, and a significant relationship between formal training and quality of teacher's teaching performance and learner's achievements is evident (Vítečková, 2014; ETUCE, 2008). For this reason, the current needs of further education of Technology teachers resulting from the changes implemented in the curricular reform were analysed.

## **2. Background of the Research**

The most significant feature of the curricular reform in Slovakia in 2008 was the introduction of the so-called State Educational Program and School Educational Program ([www.statpedu.sk](http://www.statpedu.sk)). Based on the approved reform, the government guarantees basic education as compulsory for all primary and secondary schools. Following the State Educational Program schools can create their own School Educational Program. It consists of the compulsory school educational program and optional subjects which constitute approximately 30 % of the total of the teaching lessons according to the needs of the school or region, or the learners and their parents' requirements. These lessons do not have to form part of new optional school subjects, they can be used to enhance the teaching of some compulsory subjects offered by the State Educational Program. Another change brought by the curricular reform and linked with the form and structure of the newly created educational programs, was to try to define educational areas for each level of education.

As to technology education, in the framework of the curricular reform the school subject Technical Education was renamed Technology and it was incorporated into the educational area "Man and the World of Work". It consists of three subjects: Manual Training (the first stage of basic education: primary education – ISCED 1), World of Work, and Technology (the second stage of basic education: lower secondary education – ISCED 2):

Manual Training	4th grade – 1.0 lesson per week
World of Work	7th grade – 0.5 lesson per week
	8th grade – 0.5 lesson per week
Technology	7th grade – 0.5 lesson per week
	8th grade – 0.5 lesson per week

This means that the lesson allocation for technology education - school subject of Technology was cut from 1 lesson per week to only a half of a lesson per week, provided either in the 7th and 8th grades only, or the school itself can determine the grade in which the subject is going to be taught.

After a broad criticism of the curricular reform, an innovated State Educational Program was put into practice in 2015. As to technology education, it has brought positive changes in the subject of Technology: the time allocation has increased from a half of a lesson per week taught in the 7th and 8th grades only to 1 lesson per week provided in all grades of lower secondary schools (i.e. 7th – 9th).

### 3. Methodology of the Research

Personal interviews with a research sample of teachers of lower secondary schools (ISCED 2) in Nitra region were carried out with the aim to identify training needs of Technology teachers. The process of identification of the main problems was interconnected with the realization of continuing education of Technology teachers (www.minedu.sk; Švec, 2014).

The interview was structured into nine questions, and teachers could freely express their opinions and comments. The questions were the following:

1. What do you consider the biggest obstacle in continuing education of teachers?
2. Who is the provider of teacher continuing education? From where do you get information on continuing education? What other forms of further education are organized, and by whom?
3. In your opinion, is there a sufficient offer of further education courses in your subject (Technology)?
4. What material and technical support do you have for teaching the subject of Technology in your school? Do you focus this subject more on practice or on the theory? Why?
5. What advantages and disadvantages can you see in the currently prepared new State Educational Program?
6. Due to the new State Educational Program, the time allocation for teaching the Technology subject will be increased. How will this change be implemented at your school?
7. What is your main motivation for being involved in continuing education?
8. Have you passed any form of further education yet? What topics was it aimed at? In what did you see its pros and cons?
9. What topics should be implemented in continuing education of Technology teachers in order to contribute to their professional development of their competences?

Despite the fact that the fourth, fifth and sixth question were not focused on the field of teacher training, it is possible to deduce from the teachers' answers on which areas the training should be aimed at. Such a form of indirect questioning was chosen on the basis of our previous experience, showing the fact that teachers' answers on direct questions are not evidently valuable and they do not significantly contribute to solving the problems of explicit, from practice resulting identification of needs of the content orientation of further education of Technology teachers (Dovalová, 2014).

The interviews were conducted with the total number of eight teachers from six different schools in the Nitra region. The selection of schools was influenced by the aim to realize interviews both with teachers teaching at bigger schools with higher number of learners and staff, with better technical equipment and classroom space, and with the teachers from schools with a fewer number of learners and staff, and with lower technical equipment and classroom space. On the basis of accessibility there were chosen three schools from the town of Nitra and three from its surroundings. The length of teaching practice of the interviewed teachers was between 5 and 30 years.

#### **4. Overview of the Main Research Results**

In their answers, the teachers indicated the fact that the requirement to participate in continuing education (in any forms of courses and training) in their spare time is the most frequent and most serious demotivating factor functioning as an obstacle. The reason is that the teachers being already involved in fulfilling other different and constantly increasing number of duties in their leisure time. Moreover, men as breadwinners have to look for other job opportunities in their off-time – not for further education, because of the low financial reward for teachers in general. An objection might arise here due to the fact that by obtaining a certain number of credits, teachers are given additional payment ([www.minedu.sk](http://www.minedu.sk)). The teachers argue that the financial reward is not adequate in relation to difficulties of obtaining credits and time invested, thus it does not function as a relevant form of motivation. Besides, the teachers claim that the credit system is constantly called in question by the school direction, e.g. by implementing changes, or even by a tendency to stop the already introduced system. This activates teachers' lack of confidence in the stability of the credit system itself and, subsequently, it has a demotivating effect.

Financial requirements of continuing education activities and their content scope were identified as other problems negatively influencing the teachers' involvement in further education. Teachers assert that from the point of view of the content, the activities are not sufficiently beneficial for them, they do not bring any new knowledge and they do not expressively contribute to the development of their professional competences. It is necessary to be aware of the fact that the importance of these two factors has been increasing by their mutual combination (high financial requirements of continuing education activities versus a low utility of educational activities for the participants).

A positive finding was that teachers register the regional affiliated branches of the state institution Methodology and Pedagogy Centre as the main provider of opportunities of teachers' continuing education (can be called Institution for in Service Teachers' Education and Training). Plausible was the finding that also universities are known as providers of these opportunities, though they cannot provide credits. In this context, teachers highly evaluated possibilities of non-formal meetings with colleagues from other schools. As an example of good practice some of them indicated the organization of the so called Technology Olympics. While learners were working, teachers took part in a seminar where they were discussing their work problems and were exchanging their teaching experiences.

Concerning the ways of acquiring information about possibilities to participate in various activities organized within teachers' continuing education, the webpages of the Methodology and Pedagogy Centre in Nitra, of the Faculty of Education of Constantine the Philosopher University in Nitra and, in a few isolated cases, also of the Ministry of Education, Science, Research and Sport (hereinafter Ministry of Education) of the Slovak Republic and the National Institute for Certified Educational Measurements were identified as the main sources for this kind of information. The Institute was established by the Ministry of Education on 1 September 2008 as part of the changes introduced in the educational system by the new educational law in Slovakia. The main task of the Institute is to ensure state leaving examinations provided by the Ministry of Education, and the external testing of learners in their last year of primary school attendance, and other international measurements and monitorings. Certainly, what concerns the regional branches of the Methodology and Pedagogy Centre in Nitra and

the Faculty of Education of Constantine the Philosopher University in Nitra, this concrete result is a consequence of conducting the research interviews with the teachers from this region only. In our opinion, it can be globalized, i.e. we can confirm a significant role in the organization of continuing education played by regional branches of the Methodology and Pedagogy Centre, as well as a high teachers' awareness of the regional branches activities of the Methodology and Pedagogy Centre in this area, as well as a significant role of faculties preparing teacher trainees in the relevant regions.

The Internet, emails and other promotion materials represent the sources of information mostly used for providing opportunities for continuing education. Another source is represented by colleagues – teachers from the same or other schools. A school meeting was also presented as a source of information about the current offers for continuing education.

In their courses evaluation on continuing education aimed at teaching the subject of Technology, the teachers generally agreed in their opinion that this is not sufficient, especially when comparing offered trainings in teaching other school subjects. Different opinions occurred in two cases only. The one was a teacher with 18-year teaching practice, according to whom there was no educational activity (a course or training) for the subject of Technology at all, or, at least, he did not know about it, and he was familiar only with the courses oriented at educational work itself.

The nature of teaching the subject of Technology varies to a large extent from school to school. It is taught exclusively on the theoretical basis only, or it is offered as a theoretical and practical subject at other schools but the ratio between theoretical and practical teaching differs from school to school. The main factor from which this ratio has been derived is material and facility maintenance of the concerned school. For schools chosen for our research it can be stated that better conditions occur in town schools in which the subject is taught both practically and theoretically. At village schools, the subject Technology is taught at the theoretical level mainly because these small schools do not have adequate conditions for the practical activities which should be an integral part of the subject. In spite of this, all teachers expressed as their common opinion that the development of technical and work skills would become the main commitment of teaching this subject. From the teachers' practical experience resulted that learners gradually lose their natural work habits and that is why the fulfilment of the given commitment by the school management has become more significant these days.

By trying to form and develop technical and work skills of learners, teachers can only use such technical equipment which is accessible for them – either from the point of existing but outdated workshops or from the point of limited possibilities to get the necessary material. In fact, practical teaching at schools is only realized to such an extent as the school maintenance makes possible. Otherwise, the teachers are forced to complete their teaching by providing theoretical lessons. In this respect, a rather positive phenomenon appeared with the realization of a national project named “Support for Professional Orientation of Pupils of Primary and Lower Secondary Schools to Vocational Education and Training through the Development of Polytechnic Education Aimed at Developing Work Skills and Work with Talents”. The project was carried out by the State Institute of Vocational Training (ŠIOV – Štátny inštitút odborného vzdelávania) in the period 2013 – 2015.

The project was financed by the European Union structural funds in the operational programme Education – “Modern Education for Knowledge Society”. Teachers and the professional community

called the project in its shortened version as Workrooms. Its goal was to start vocational education and training already at primary schools and to strengthen the development of work skills of pupils at primary schools and the work with talented learners through polytechnic education. This should have been reached by establishing special classrooms of Chemistry, Physics, Biology and Technology at primary schools, in which the teachers could provide their lessons in such a manner by which the learners' work skills would have been practically and illustratively developed through polytechnic education and by using modern innovative teaching methods and forms of education. In the project, a total number of 48 primary schools were selected for the pilot research within which they were fully equipped with the teaching aids, tools, instruments, apparatus and educational facilities for teaching Technology and natural science subjects (Physics, Chemistry, Biology). As there are 1 457 primary and lower secondary schools in Slovakia, the Ministry of Education, Science, Research and Sport decided to continue this perspective activity with a new project Workrooms II. Other 500 schools were selected to be equipped with the necessary teaching aids within this project.

The positive impact of the project Workrooms was also evident in the context of the conducted personal interviews with the Technology teachers. The teachers put this project in the context with the increasing time allocation for teaching the subject of Technology at lower secondary schools from 0.5 of a lesson per week to 1 lesson per week and with extending teaching the subject into all grades (from 6<sup>th</sup> to 9<sup>th</sup>) in accordance with the innovated State Educational Program. In general, the given changes were accepted by the teachers positively with a spontaneous decision of the need for their continuing education. Here are some examples of their comments:

A teacher with 20-year practice:

*We have got new technology equipment for the school workshop what requires further education of teachers in this field. Teaching the subject of Technology focused more on the theory than practice at our school, but thanks to the project we have got new equipment in our workshops, so we are able to teach the subject of Technology more practically now. As there was no other choice before, so I have preferred theoretical education of the subject of Technology by now. After receiving the new equipment I will certainly prefer practical teaching. I have been thinking about starting new courses in the field of technology which would be provided in our new workroom.*

A teacher with 30-year practice:

*We have had a workroom with outdated equipment till now. But with the help of the national project we have got completely new equipment of our workrooms where teaching Technology will be provided. However, I do not know yet in what way more Technology lessons will be realized in accordance with the innovated State Educational Program as I am the only Technology teacher at this school. A problem is in a high number of pupils in Technology classes, thus it is rather difficult to work with them effectively. It would be convenient to divide the class into two groups. However, I do not have any idea how this problem will be solved. I will be retired in three years, so I have no motivation for further education.*

A teacher with 20-year practice:

*I cannot answer the question (question 6), as we do not have equipment for teaching the Technology subject at our school. That is why I think that more theory will be taught in this subject.*

What concerns their previous participation in continuing education, all the teachers have already passed some form of this kind of education – mostly aimed at the development of general educational (pedagogical) competences.

## **5. Conclusion**

The main contribution of the presented research lies in the identification of the most serious problems arising out of the changes introduced by a curricular reform in Slovakia in the area of technology education at lower level of secondary schools in Slovakia (ISCED 2). This issue is followed by the identification of the most serious issues connected with the training needs of Technology teachers and current state of the continuing education possibilities offered to them.

The research carried out within the project was based on the personal inquiry being one of the methodologies used in the qualitative studies. Qualitative studies are common tools used in understanding and describing the world of human experience. However, it is important to clarify that the generalization of the results derived from the interviews that were carried out must be viewed from the constructivist point of view. According this point of view, all phenomena are specific due to their time and context. Moreover, Denzin (1983) points out that the author's insight into the generalization of data is only a reconstruction of subjective perspectives of people in specific situations. A critical rationalist position towards data generalization calls attention to the fact that a complete inductive proof of general statements is not possible.

To conclude, the realization of the national project "Support for Professional Orientation of Pupils of Primary and Lower Secondary Schools to Vocational Education and Training through the Development of Polytechnic Education Aimed at Developing Work Skills and Work with Talents" has increased teachers' interest in continuing education and created a clear image about their needs (concretization of content orientation of their continuing education). Out of this context, the most significant motivational factor of the involvement into the activities of further education was naturally expressed by receiving financial stimuli (an extra reward on the basis of the credits acquired). The second significant motivational factor expressed by the teachers was the actualization of the gained knowledge (also for a novice teacher with five years of teaching practice), a possibility to learn something new and interesting, and obtaining methodical instructions to increase the quality of their educational activities.

The need for the improvement of the educational program and for better material and technical conditions of (not only) Technology teachers at primary and lower secondary schools arises alongside with the rapid global changes and new trends in education requiring the "bridging" of theoretical knowledge with practical usage. It is the teacher who should be continuously trained and willing to accept, and, consequently, to apply creative and innovative approaches to teaching his/her subjects. The



participation in various forms of continuing education will definitely contribute to teachers' professional development and will improve their teaching performance. Therefore, the training needs of (Technology) teachers have to be clearly identified to become essential part of the educational program design.

As stated in the OECD document Teacher Evaluation (OECD, 2009), there are two major purposes of teacher evaluation. The first one is to improve the teacher's own practice by identifying his/her strengths and weaknesses for further professional development and the second is to ensure that teachers perform at their best to enhance pupils' learning. The main aim of the conducted interviews was to identify the training needs of teachers, and, at the same time, this survey can serve as an example of an indirectly led assessment of the interviewed teachers as it has fully contributed to the fulfilment of the mentioned purposes of the teacher competence assessment.

### **Acknowledgment**

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-14-0446.

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