How to Evaluate Technology Subject Teachers

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Abstract

Becoming a good teacher is a matter of how a teacher works in practice, during which he or she gains experience and learns not only how to teach but how to teach well. The pre-service teacher training is only a beginning of this process. And even if a teacher acquires the ability to teach well, this ability cannot be considered as already definitely or completely developed and sufficient. One of the key factors supporting a teacher in his or her more or less lifelong effort to reach “excellence” in his or her professional career is teacher evaluation.

As it was presented at the V International Forum on Teacher Education IFTE 2019, Constantine the Philosopher University was a solver of a national project Evaluation of Teachers Competences (2016 – 2019). The main goal of the project was to develop evaluation tools applicable to evaluate quality and qualification of primary and secondary school teachers teaching performance. The set of the developed evaluation tools has been based on a stratified approach and has been assigned for all teachers, without any regard to their majors.

In Slovakia one of the compulsory subjects taught at the lower level of secondary education is the subject Technology. A specificity of this subject is that its concept is based on practical activities of students, which should be practised in specially equipped classrooms (so-called school workrooms). With respect to this specificity Technology subject teachers should have, beside the “basic general” competences needed for a successful teacher’s performance of his or her profession (which are common for the successful performance of the teacher profession independently on the subject s/he teaches), also some other, specific competences connected with their ability to carry out educational activities in the environment of the school workrooms.

From the above-mentioned results a question to which measure the developed evaluation tools are applicable in practice also for Technology subject teachers. To verify the applicability of the designed tools in relation to Technology subject teachers a case study was carried out. In the paper methodology and summary of the results of the carried out case study are presented.

Key words: evaluation of teachers, teachers’ professional competences, school subject technology, technology teachers

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Introduction

Becoming a good teacher is a matter of how a teacher works in practice, during which she or he gains experience and learns not only how to teach but also how to teach well. Pre-service teacher training is only a beginning of this process. And even if a teacher acquires the ability to teach well, this ability cannot be considered as already definitely or completely developed and sufficient. There are a lot of factors influencing teachers on their road to the status of being a good teacher. One of the key factors supporting teachers in their more or less lifelong effort to reach "excellence" in their professional career is teacher evaluation.

In connection with the absence of a systematic approach to the relevant assessment of the level of teachers' professional competences in Slovakia, a team of experts from Constantine the Philosopher University in Nitra raised the need of solving the issue (Králik & Ambrozy, 2019) and Constantine the Philosopher University became a solver of a national project Evaluation of Teachers Competences (2016 – 2019). The team of the experts responsible for the project solution consisted of teachers from three of five faculties of the Constantine the Philosopher University (Faculty of Arts, Faculty of Education and Faculty of Natural Sciences), who, in their teaching activities, have been involved in primary and secondary teacher training.

The main goal of the project was to develop a comprehensive model for teacher competence evaluation and to it related evaluation tools, applicable to valuate quality and qualification of primary and secondary school teachers teaching performance.

Some of the project outputs were already presented at the V International Forum on Teacher Education IFTE 2019 (Gadušová, Hašková, & Predanocová, 2019).

Contrary to the traditional approach to the evaluation of the professional work of teachers in Slovakia, the newly developed methodology of the evaluation of teachers is based on the stratified approach (Gadušová, Hašková, & Jakubovská, 2018), which brings two specifics into the evaluation process. Firstly, a teacher is not evaluated in his/her complexity (one does not evaluate his/her professional performance in all) but in concentrating on some particular competence from the ten ones which were identified as the key (in meaning to be decisive for a successful performance of the teacher profession). List of these competences, the key ones of the teacher professional profile, is presented in Table 1.

The second specific feature of the developed stratified approach to teachers’ evaluation is the design of ten Assessment Sheets for evaluators (lesson) observers, to them relevant ten Self-Assessment Sheets for teachers who are being observed and evaluated, and, finally, ten sets of questions proposed for Post-Observation Interview of the evaluator(s) with the evaluated (observed) teacher. In this way the developed stratified approach to teacher evaluation brings a new specific feature to evaluation - during one lesson the teacher is evaluated not holistically, following different aspects of his/her educational performance (all possible kinds of competences), but only one of his/her specific professional competences is observed and assessed (i.e. each of the ten key competences is assessed individually, in another lesson). So the evaluated competence can be observed more closely how it is applied and whether it is applied properly in teaching process, and various nuances of its manifestation can be monitored (Gadušová et al., 2019; Gadušová et al., 2018). The stratified approach to teacher
evaluation, which is used in case of the teacher assessment methodology created within the noted project can be taken as similar or analogical to philosophy of teacher performance assessment which Darling-Hammond (2010) presents as structured teacher performance.

Table 1. Overview of the competences identified as the key ones for a teacher`s professional performance

<table>
<thead>
<tr>
<th>Key competences of the teacher professional profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Ability to identify learner`s developmental and individual characteristics</td>
</tr>
<tr>
<td>C2: Ability to identify psychological and social aspects of learner`s learning</td>
</tr>
<tr>
<td>C3: Ability to develop learner`s personality and competences</td>
</tr>
<tr>
<td>C4: Ability to create and maintain positive atmosphere in the classroom</td>
</tr>
<tr>
<td>C5: Ability to plan and implement teacher`s own professional development</td>
</tr>
<tr>
<td>C6: Subject related professionalism of the teacher</td>
</tr>
<tr>
<td>C7: Ability to plan and manage educational process</td>
</tr>
<tr>
<td>C8: Ability to use variety of teaching aids in educational process</td>
</tr>
<tr>
<td>C9: Ability to select and use relevant teaching methods and organizational forms</td>
</tr>
<tr>
<td>C10: Ability to evaluate learner`s learning achievements</td>
</tr>
</tbody>
</table>

In order to get a better idea about the designed assessment tools, as an example of them, the Assessment and Self-Assessment Sheets and the Record Sheet for the Post-Observation Interview designed to the competence C3 - Ability to develop learner`s personality and competences, are presented in Appendixes 1 - 3.

What is very important to stress is that the set of the evaluation tools is assigned for all teachers, regardless their majors. So here a question arises whether the developed evaluation tools, based on the stratified approach to the evaluation of teachers` competences and without any regard to their majors, can be applied equally successfully for teachers of different majors.

Purpose and objectives of the study

In Slovakia one of the compulsory subjects taught at lower level of secondary education is the subject Technology. The subject is taught to students at the age 10-15 in a time allocation of 1 lesson per week. Students at the age 10-15 are in grades 5-9 of their compulsory schooling which is carried out at so-called basic school. In Slovak conditions these grades represent “upper primary education” (so called second level of primary education) but in context of the International Standard Classification of Education they represent ISCED 2 - lower secondary education.

In general, the subject Technology is understood as student preparation for their future job profession, as a key factor supporting their acquainting with labour market and significantly supporting to form their professional orientation. In this sense the mission of the subject is used to be defined. But as a matter of fact, this is only a secondary mission of the subject of Technology. The main, its primary mission is to develop students` technical thinking and skills, and this mission should be achieved and fulfilled not in the meaning “to make, to produce”
but in the meaning “to be aware and to understand principles”. Unlike the other school subjects taught within lower secondary education, this subject is dominantly oriented on practice what is proved also in the State Educational Program (ŠPÚ, 2015). Its specific feature is that its content follows, or is based on practical activities of students and on experience-based form of teaching and learning. Content of Technology teaching has in a deliberate and purposeful way to develop students’ manual skills, abilities and working habits which can be applicable in both their personal future life as well as in their acting in frame of the society. There is an agreement of Technology teachers in their opinion, resulting from their teaching experiences, that students do like this subject, and even if it is not their favourite subject they at least do like the parts of lessons which are fulfilled with practical activities. As to teaching the subject of Technology, it is very important not to lead its teaching in a theoretical way because this makes students sicken. For this reason, Technology cannot, or should not be taught in the environment of a common classroom. Content of its teaching requires schools to have specially equipped classrooms, so-called workrooms, to teach it. Specially equipped means on the one hand to have there at disposal appropriate numbers of different sets, tools, devices and measuring instruments, and on the other hands to have at disposal appropriate materials to train students to work with these sets, tools, devices, measuring instruments. These specially equipped classrooms (workrooms) represent an appropriate necessary learning environment enabling to train students how to handle and work with different tools, devices and various types of materials, develop their skills in this direction, teach them to adhere to work habits and work safety and lead them to create and make their own products, both on their own and in group work (Valentová & Brečka, 2017; Serafin et al., 2016).

From the above mentioned logically results that Technology teachers have to dispose also some specific professional competences, besides the general key competences of a teacher, to be able to ensure and successfully manage teaching of the practical activities of students in the learning (training) environment of workrooms. These are related to Technology teachers’ skills and abilities to work with the relevant tools and devices, to use them in a right and safety way, to organize students’ work in the environment of school workrooms (keeping the respective legislative rules and regulations), to create appropriate training activities (including their own skills to construct the particular subject products), etc.

As the Technology subject teachers should have, beside the basic general competences needed for a successful teacher’s performance of their profession (which are common for successful performance of the teacher profession independently on the subject s/he teaches), also some other, specific competences connected with their ability to carry out educational activities in the environment of the school workrooms, here a question arises to which measure the evaluation tools developed within the national project Evaluation of Teachers Competences are applicable in practice also for Technology subject teachers. To verify applicability of the designed tools in relation to Technology subject teachers a case study, which is presented hereinafter, was carried out.

**Literature review**

Teachers have been accepted as a profession that has an important task to influence both social and personal development as there has been increased social awareness of the significant role of education all areas. Demand for quality assurance of education has caused in international context an increasing interest in assessing teacher competence (Roelofs & Sanders, 2007).
As one of the key factors, on which the quality of education significantly depends, is the personality of the teacher, a great attention is paid to assessing professionalism of teachers and their professional competences (Magová, 2016; De Coster et al., 2015; European Commission, 2013). Another reason why the attention is on a long-term basis paid to assessing teachers is the fact that becoming a good teacher is a matter, one can say, of the whole life-long professional career of the teacher. Pre-service teacher training is only a beginning of the process of becoming a good teacher (Stranovská, Vítečková, Gadušová, & Procházka, 2016; Kasáčová, 2002). To be a good teacher needs not only to have knowledge how to teach. It requires also to have practice and experiences in teaching and even this everything is not enough. It is not enough because even if a teacher acquires the ability to teach well, this ability cannot be considered as already definitely or completely developed and sufficient. And one of the most important factors supporting a teacher in his or her more or less lifelong effort to reach "excellence" in his or her professional career is teacher evaluation (Stranovská, Lalinská, & Boboňová, 2017, 2018). However, in practice there is not still paid an appropriate attention to teacher assessment (assessment of the teacher’s professionalism).

Dominantly teacher assessment is used to be done through assessment of the learning results achieved by their pupils and students or through assessment of the teacher global performance (Darling-Hammond, 2010). Undoubtedly a teacher has a central position in student learning. But this position has to be given into the relation to a sustainably monitored and assessed quality of teacher performance. Teacher assessment should be perceived as a unity of two sides of a coin, on the one hand assessment of teacher’s performance, with focus on the mastery with which s/he is teaching the subject matter, and on the other hand encouraging teacher’s sustainable self-development (Gadušová et al., 2017; Wilkerson & Lang, 2007). Moreover, professionalism of teachers must be run in accordance with the development of science, technology, art, and progress of society. That is why teachers face still new and new challenges and changes that require them to equip themselves with new knowledge and skills (Kabadayi, 2016).

So as it results from the noted, assessment of teacher performance competence should be conducted in a way to improve teacher performance. Assessment of a teacher’s competence should improve the teacher’s performance of his/her job (OECD, 2009). Moreover, without having a feedback through assessment, the teacher is less motivated in learning and self-developing.

Evaluation of teacher competence and performance can be done in different ways. To the most often used belong teacher performance observation, monitoring of learners’ products and work examples (learning achievements) and teacher’s portfolio (Wilkerson & Lang, 2007). However, to evaluate teacher competence requires a clear definition of what is going to be evaluated, i.e. it requires a clear definition of what competence is assessed to have an idea what should be observed and which data should be collected (Sandanusová et al. 2018; Roelofs & Sanders, 2007). In general, one has an idea what the notion of competence means but in exact terminology contexts the meanings can varies. Teacher competence is a multi-dimensional construct which refers to performance and rational action to meet certain specifications in the task of education. It represents different knowledge, skills, abilities, approaches and capabilities to facilitate learning (Carreker & Boulware, 2015; Redding, 2014; Kyriacou, 2008; Baumert & Kunter, 2006; Průcha, 2002) which should be reflected in some way in assessing teacher competence.
Methodology

To verify applicability of the designed tools for evaluation of teachers teaching different subjects several case studies were carried out. A very complex one was a case study in frame of which applicability of the created tools for Technology teachers was verified.

Subject of the case study was, using the newly designed evaluation methodology and the developed assessment tools, to observe and evaluate all ten key competences (presented in Table 1) in relation to the same Technology teacher. This was to be done from the point of view of a member of the school manager, a member of the school staff (a colleague teaching the same subject) and the evaluated teacher himself.

The evaluated teacher was a qualified teacher of the subject Technology with a long teaching experience at school. The teacher was evaluated by the two evaluators at the same time. One of the evaluators was the chair of the subject committee (E1) and the second one was a colleague of the evaluated teacher (E2), also a qualified teacher of the subject Technology with a long teaching experience at school (Gadušová, Hašková, & Szárszói, 2020).

Consequently, the evaluators’ records from the Assessment Sheets and the teacher’s records from Self-Assessment Sheets were mutually compared and analysed, and results of the analysis served as a platform for answering the above-mentioned research question. The recorded assessments were ranked by means of the scale A – very good, B – good, C – appropriate, D – poor, E – insufficient.

The case study was carried out within the school year 2019/2020, before the corona epidemic arose. The Post-Observation Interview was not a part of the case study.

Results

An overall comparison of the evaluators’ ratings with the self-evaluation of the evaluated teacher is provided in Table 2.

<table>
<thead>
<tr>
<th>Competence</th>
<th>Evaluator E1</th>
<th>Evaluation Evaluator E2</th>
<th>Evaluated teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C2</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>C3</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C4</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>C5</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C6</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>C7</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>C8</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>C9</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>C10</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

Analysis of the particular records of the two evaluators (observers E1, E2) showed that during the observed lessons the evaluated teacher proved high level of his competence in respect to all the key professional
competences monitored, what was stated by the evaluators in the overall rating (Table 2). Occasionally there was a one-level difference between evaluators when evaluating some items (particular item of the competence, not the overall evaluating of the particular competences). But this was not a frequent case. In the selection of possible evaluation responses there was almost a full agreement between the evaluators. Another situation occurred when the evaluators were supposed to name the problem in their own words. Here subjective opinions were already presented and the evaluation reflected different perspectives of one and the other evaluator on the performance of the evaluated teacher during the lesson.

From the perspective of the evaluated teacher, his professional competences are well developed and their high level of application was proved during the observed lessons. He could find only minor areas where he can see some areas for his further improvement. What is important, however, is the fact that he has realized the need for continuous development and education in order to “keep up with the times”.

Discussions

The data in Table 2 show that the overall ratings do not differ much, what is either a result of well-designed assessment tools or the effort of both the evaluators and the evaluated teacher to be as objective as possible or they are the combination of both these facts. Our findings are as follows:

- the evaluators came to the consensus and stated the same overall rating for all the monitored competences,

- in two cases, the evaluated teacher ranked himself higher by one level than the evaluators did (competences C2 and C6),

- the evaluated teacher ranked himself one level lower in the case of the competence C8.

In general, the case study has proved applicability of the created evaluation tools also for evaluation of Technology teachers. However, our long-term experiences with assessment Technology teachers’ competences, especially the novice teachers (Hašková & Gadušová, 2017; Tarčáková, 2017), point out that to the weaknesses of these teachers belong the following ones:

- their ability in teaching Technology to apply cross-curricular relation of other subjects to Technology,

- their uncertainty regarding their knowledge preparedness relevant to the content of their major,

- their ability to create their own products (on the basis of the different taught manual activities).

Usually Technology teachers do not have any more serious problems to manage different situations arising while students are working in the school workrooms, but while designing teaching activities to be used during the students’ working activities in the school workrooms they do not feel themselves very self-confident. In general, in the context of the specific competences of Technology (novice) teachers the ability to create (produce) different products can be marked as the most significant weakness of their professional profile.
Conclusion

Taking into account our experiences, although the case study in general has proved applicability of the created evaluation tools also for evaluation of Technology teachers, we see some weaknesses of the final versions of the evaluation sheets. The weaknesses concern the practical aspects of teaching the subject Technology. But as these aspects are specific just for the subject Technology, evaluation of the teacher’s competence to manage training of manual activities of students should be evaluated, or more stressed, in frame of the evaluation of the competence C6 - subject related professionalism of teachers (to which the evaluation sheets are as well as the others designed with special respect to none of the taught subjects, i.e. they or their fulfilment should be always “modified” with respect to the specificities of the major taught by the evaluated teacher). In this context also the results of the carried out case study related to the assessment of the competence C6, in particular the difference of the overall evaluation of this competence between the evaluators E1 and E2 on the one hand and the evaluated teacher on the other hand might be a consequence of this fact.

Acknowledgement

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References


# APPENDIX 1

## ASSESSMENT SHEET – C 3

**Developing learner's personality and competences**

**School** (name and location): .................................................................................................................................

**Date:** ........................................................................................................................................................................

**School subject:** ......................................................................................................................................................

**Class:** ...................................................................................................................................................................

**Order of the lesson in the timetable:** ........................................................................................................................

**Topic of the lesson:** ..................................................................................................................................................

**Teacher** (name): ....................................................................................................................................................

**Number of years of teaching at school:** .................

**Evaluator** (name): ..................................................................................................................................................

Mark on scale, 1 = yes, 2 = rather yes, 3 = rather no, 4 no, CNJ = cannot be judged (if the phenomenon did not occur at the lesson).

**To what extent did the teacher take into account the development of the pupil's personality and competences?**

1. Did the teacher develop the personality of the pupil and their competences?   1 – 2 – 3 – 4 - CNJ

   How did that manifest?

   ........................................................................................................................................................................

   ........................................................................................................................................................................

   ........................................................................................................................................................................

   ........................................................................................................................................................................

2. Which aspects of the pupil's personality development did the teacher develop?

<table>
<thead>
<tr>
<th>Aspects of personality development</th>
<th>Method, form, strategy (how did the teacher develop competences) in different phases of the lesson</th>
<th>What was their impact on pupils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive (memory, perception, thinking, critical thinking, imagination, phantasy and creativity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affective (emotions, attitudes and believes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social (cooperation, communication, empathy, acceptance, unity and coherence of pupils, work with tension in the class)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conative (motivation and values)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Did the teacher take into account the diversity of cultures in the multicultural environment and their influence on the personality of the pupil? 

4. Was the teacher able to identify pupils from a socially disadvantaged environment? (Has (s)he had experience of working with pupils from a socially disadvantaged environment?)

5. Was the teacher able to identify and accept pupils’ differences without prejudices and stereotypes? (social, intercultural)

How did he do that and how did he get on with it?

Conclusions and recommendations of the evaluator:

Statement (agreeable / disagreeable) of the assessed teacher:

Signature of the assessed teacher:
APPENDIX 2
SELF-ASSESSMENT SHEET – C 3
Developing learner's personality and competences

School (name and location): ...................................................................................................................

Date: ....................................................... School subject: ...............................................................

Class: ..................................................... Order of the lesson in the timetable: .........................

Topic of the lesson: ..............................................................................................................................

Teacher (name): .................................................. Number of years of teaching at school: ...........

Mark on scale, 1 = yes, 2 = rather yes, 3 = rather no, 4 no, CNJ = cannot be judged (if the phenomenon did not occur at the lesson).

To what extent did I take into account the development of the pupil's personality and competences?

1. Did I develop the personality of the pupil and their competences? 1 – 2 – 3 – 4 - CNJ

How did that manifest? ....................................................... ............................................

2. Which aspects of the pupil's personality development did I develop?

<table>
<thead>
<tr>
<th>Aspects of personality development</th>
<th>Method, form, strategy (how did the teacher develop competences) in different phases of the lesson</th>
<th>What was their impact on pupils</th>
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<td></td>
</tr>
<tr>
<td>Conative (motivation and values)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Did I take into account the diversity of cultures in the multicultural environment and their influence on the personality of the pupil?

1 – 2 – 3 – 4 – CNJ

4. Was I able to identify pupils from a socially disadvantaged environment? (Do I have any experience of working with pupils from a socially disadvantaged environment?)

1 – 2 – 3 – 4 – CNJ

5. Was I able to identify and accept pupils' differences without prejudices and stereotypes? (social, intercultural)

1 – 2 – 3 – 4 – CNJ

How did I do that and how did I get on with it?

....................................................................................................................................................

Signature of the teacher: ............................................................................................................
APPENDIX 3

POST-OBSERVATION INTERVIEW – C 3
Developing learner’s personality and competences

1 Is it currently easy to develop pupil's personality and competences when there are so many different external influences on the pupil?
2 Which areas of the improvement, development of pupil's personality do you consider important?
3 Why do you consider them necessary to develop?
4 On which factors of pupil's personality development (cognitive, affective, and others) do you focus most (and least) while teaching?
5 Can you realistically accept different ways how pupils learn in your lessons?
6 Can you identify the socio-cultural context of pupil's development?
7 How do you do that, what methods/techniques/procedures do you apply/use?
8 Do you take into account the differences of cultures, or social differences of pupils in the class?
9 How do these differences influence the development of pupils’ personality in the class?
10 Do you have any experience with pupils from a socially disadvantaged environment?
11 How do you work with them and develop their personality?

RECORD FROM POST-OBSERVATION INTERVIEW – C 3

Teacher (name): ..................................................................................................................
Observer/Evaluator (name and function): .............................................................................

Comment on question number:
1. ..............................................................................................................................................
2. ..............................................................................................................................................
3. ..............................................................................................................................................
4. ..............................................................................................................................................
5. ..............................................................................................................................................
6. ..............................................................................................................................................

and others.