

Opportunities for Improving the Quality of Education and Pedagogical Teacher Training, within an International Context

Roman Hrmo

DTI University, Ul. Sládkovičova 533/20, 018 41 Dubnica nad Váhom, Slovakia,
hrmo@dti.sk

István Szókö

Trnava University in Trnava, Priemysel'na 4, 918 43 Trnava, Slovakia,
istvan.szokol@truni.sk

Lucia Krištofiaková

DTI University, Ul. Sládkovičova 533/20, 018 41 Dubnica nad Váhom, Slovakia,
kristofiakova@dti.sk

Abstract: In this paper, the authors point out the importance of high-quality teacher training, as well as some opportunities for its improvement in an international context. They deal with the current situation and present their views on the discussed field. The paper also presents the activities of the International Society for Engineering Pedagogy IGIP. The authors deal with the issues of teacher training carried out within the international Erasmus+ project ENTER - EngineeriNg educaTors pEdagogical tRaining. Based on the Standards issued by the Slovak Accreditation Agency, it can be stated, that for teachers, it is necessary to develop their vocational, language, pedagogical and digital skills, as well as any of their transferable competencies. In the paper, the outputs and other planned intents, related to the realization of pedagogical teacher training, are introduced. In addition, pre-service teachers' opinions on the realized activities and the offered courses are presented, and recommendations for the teaching practice are formulated.

Keywords: teacher; pedagogical teacher training; IGIP; project ENTER

1 Pedagogical Teacher Training

As Turek claims [25], teachers are among the decisive factors in the educational process, which was also clearly declared by Ušinskij (1948, p. 62) – no organizational rules or curriculum, no artificial mechanism – irrespective how well invented, can replace personality in education. Without a direct contact between educators and their mentees, no real education penetrating the character is possible. Only a personality can have an impact on personality development and determination. One's character can only be shaped by another character.

Tabak *et al.* [23] point out that teacher training programs, which maintain the goal of increasing the quality and professional development of teachers, have frequently been discussed. Prospective teachers' expectations of and concerns about the future may provide important information for teachers' professional development as well as the design of teacher training programs. Questions regarding how teachers prepare for effective education and training [2] [9] [13], how they create a professional identity for themselves [3] [10] [17] [20] [23], and, ultimately, how they struggle to transfer their knowledge into practice for their students [7] form the basis of many studies focusing on various aspects of the field. In the new century, answers are sought to the questions of which skills are required for individuals to succeed and which professional competencies teachers should have so that they can transfer these competencies to their students [12] [19].

We agree with Driensky [5], who claims that teachers are and have always been the most important determinants of the educational process. They can perform their important role only if they are capable of leading their students effectively not only towards professional but also personal competencies. Therefore, the job of a teacher requires high professional and pedagogical erudition [5].

A continuous improvement in the quality of education and increasing teachers' quality can be considered important [1-11] [8-22].

At universities, in many cases, it comes to a situation when there are renowned professionals who have not taken part in pedagogical training. Such a situation motivates us to the realization of activities which can increase the quality of pedagogical teacher training.

2 Selected Approaches Focusing on Improving the Quality of Education and Increasing University Teachers' Quality

In the following part of the paper, we will deal with selected approaches and activities in the context of university education quality assurance and increasing university teachers' quality. We point out the activities and the importance of the International Society for Engineering Pedagogy IGIP and the activities carried out within the project EngineeriNg educaTors pEdagogical tRaining – ENTER. We actively participate in the above activities and we believe that they are beneficial for university education quality assurance both in Slovakia and abroad.

2.1 International Society for Engineering Pedagogy IGIP

We agree with Turek [25] who claims that if teachers want to perform their tasks effectively – to educate and to develop their students' personalities – they must possess sufficient knowledge in the field, have good pedagogical training and high general culture. They should have high-quality professional training, as well pedagogical and general education. Considering the above, we focus on the activities and the importance of the International Society for Engineering Pedagogy IGIP.

The International Society for Engineering Pedagogy IGIP (Internationale Gesellschaft für Ingenieurpädagogik, International Society for Engineering Pedagogy) was founded in 1972 at the University of Klagenfurt (Austria) by Adolf Melezinek. Establishing an engineering pedagogy was a step forward at that time, engineering and pedagogy had never been linked before on a scientific level. Even in the seventies of the 20th Century European integration and standardized profiles for educators were seen as most important factors of education, training and learning [15]. Engineering pedagogy is a frontier scientific discipline, which transforms pedagogical and psychological knowledge to the field of technical sciences with the aim to increase the didactic efficiency of engineering education. The subject of engineering pedagogy is formed by knowledge necessary for a rational training of teachers of technical subjects who will educate future engineers. Education is understood in its broader sense as it does not exclusively deal with didactic questions but also pays attention to upbringing [4]. IGIP promotes scientific research, coordinates and supports international initiatives and activities in the field of engineering education [14].

The International Society of Engineering Pedagogy created an international register of engineering educators Register ING-PAED IGIP – which since then guarantees minimum standards in technical expertise and a well-balanced competence profile for engineering educators. The register lists qualified

educators who had gone through an IGIP prototype curriculum. Those registered are International Engineering Educator and can use the title ING-PAED IGIP [15].

The existence of the Register as well as the degree ING-PAED IGIP – in general – have a positive impact on technical subject teachers' social status. In states, where IGIP operates (currently more than 70 countries including most EU Member States), the degree means that a person is qualified for teaching technical subjects [16]. IGIP accredits training centers for "International Engineering Educators" which conforms to IGIP's curriculum for engineering pedagogy [15]. In Slovakia, the first information about engineering pedagogy were mediated by professor Dušan Driensky who was appointed to the international IGIP Scientific Advisory Board in 1986 and in year 1993, he established the Slovak IGIP national working group in Bratislava [4]. Currently, the Slovak section of IGIP is based at DTI University in Dubnica and Váhom.

2.2 The Engineering educators Pedagogical Training Project – ENTER

The Engineering educators Pedagogical Training - ENTER project is being solved as a part of the Erasmus+ program – key activity Cooperation for innovation and the exchange of good practices. The project intent is based on the situation, when teachers of engineering majors often have broad and solid expertise in their subject field but lack pedagogical competencies relevant to the modern learning environment. Higher education teachers and lecturers should have such pedagogical competencies which enable them to implement key educational approaches of the 21st Century [1].

The main goal of the project is to develop a multilevel modular system for pedagogical teacher training – the program ENTER iPET, which will be based on international collaboration. The project is focused on university teachers and takes into account their needs (low cost, convenience, mutual recognition, peer-reviewed quality assurance, customization), aims to greatly increase the number of engineering educators enrolled in pedagogical and professional improvement programs. This will have a profound impact on the quality of university education in ENTER member higher education institutions, but later, on universities in the whole European Union. i-PET program accreditation is also one of the project's objectives.

The ENTER proposes a hierarchy of 3 structured educational programs for engineering educators - iPET program, in the context of the European Qualifications Framework for Lifelong Learning:

- iPET-1 Short-focused (2 ECTS) – “Qualification Development” Certificate
- iPET-2 Professional Retraining (8 ECTS) - Diploma “Higher Education Teacher”

- iPET-3 International recognized (20 ECTS) - a full program leading to international accreditation as “Engineering Educator” [5]

The aim of the project is to ensure that iPETs meet the European standards for the quality of education in engineering study programs.

In the following part of the paper, we introduce the outputs and intents of the international Erasmus+ project **ENTER – EngineeriNg educaTors pEdagogical tRaining**, as well as the proposed courses.

3 Concretization of Outputs, Intents and Proposed Courses within the ENTER Project

The ERASMUS+ ENTER (EngineeriNg educaTors pEdagogical tRaining) project was set up by a consortium of HEI’s and Accreditation Agencies from Europe, Russia, and Kazakhstan. The main idea of the ENTER project is to build the capacity of engineering HEIs due to the strengthening of engineering educators’ preparation with innovative engineering pedagogy. Because of this particular sort of educator’s concerns to such a specific field that has a high impact on scientific progress and innovative development of humanity it is very important how the teaching and learning processes are organized and what is the content and teaching methodology. That has a great impact on the potential quality of learning outcomes of future engineers and consequently on the industry and economic development. The innovations of the 3-tiered training programs (i-PET programs) meet the needs of the engineering educator’s pedagogical development [18].

ENTER Consortium consists of the following institutions:

Project Coordinator

- Instituto Politecnico do Porto, Portugal

European partners

- DTI University, Slovakia
- Tallinn University of Technology, Estonia

Russian and Kazakh partners

- National Research Tomsk Polytechnic University, Russian Federation
- Kazan National Research Technological University, Russian Federation
- Tambov State Technical University, Russian Federation
- Don State Technical University, Russian Federation
- Association for Engineering Education of Russia, Russian Federation

- Al-Farabi Kazakh National University, Kazakhstan
- Academician E. A. Buketov Karaganda State University, Kazakhstan
- Kazakhstan Association of Engineering Education, Kazakhstan
- Vyatka State University, Russian Federation
- Association for International Education Support «Bologna Club», Russian Federation [5].

The proposed structure of educational programs for teachers including individual modules is displayed in Table 1.

Table 1
Structure of iPET educational programs

Program	Course	ECTS
iPET-1 (2 ECTS)	1.1 Innovations in engineering pedagogy	1
	1.2 Time management	0.5
	1.3 Effective interaction	0.5
iPET-2 (8 ECTS)	2.1 Enhancement of learning interactivity	1
	2.2 System analysis in education	1
	2.3 Pedagogical psychology and communication	1
	2.4 Interaction with stakeholders	1
	2.5 Sustainable development	2
iPET-3 (20 ECTS)	3.1 Digital education	2
	3.2 Problem-based, Project-based and practice-oriented learning	2
	3.3 Learning outcomes' assessment	2
	3.4 Course design	1
	3.5 Engineering innovation process	2
	3.6 Final project	3

Note: The modules of iPET-1 are included in iPET-2 and those are included in iPET-3

Source: Project EngineeriNg educaTors pEdagogical tRaining - ENTER

Throughout the process of project realization, two main parallel processes take place – developing the iPET program and developing the quality management standards for the iPET program. The above is displayed in Figure 1.

The goal is to ensure that iPET educational programs meet the European quality standards for education in engineering studies.

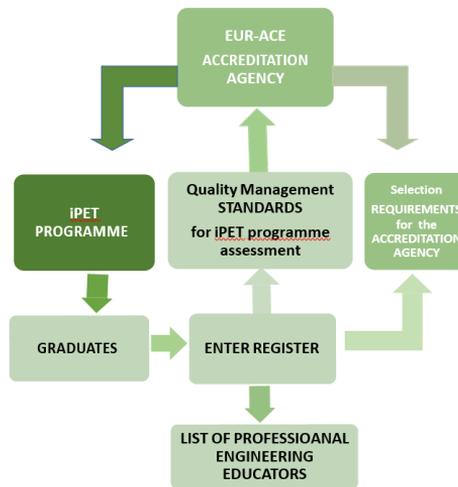


Figure 1

Development of the iPET program and development of quality management standards for the iPET program [6]

4 Feedback on Education Quality and Teacher Quality Assurance

For the purposes of research and gathering feedback on the quality of education and teacher quality, a range of tools can be used. In the paper, our intention is to point out some verified examples of good practice.

Students form an important interested party in a university and, therefore, their opinions can be considered very important. Students belong to the main actors in the school environment and by finding out about their opinions, universities can gain information necessary for university education quality and teacher quality assurance.

The significance of students' opinions is reflected in the criteria for the assessment of conformity between the internal system of a university and the standards for the internal system, and the criteria for the evaluation of standards for a study program.

In compliance with the Standards issued by the Slovak Accreditation Agency for Higher Education, students are provided with an opportunity to comment on the quality of study programs, the quality of teachers, the quality of support services and the quality of the university environment at least once a year. Gathering relevant feedback from all interested parties forms a part of monitoring and

evaluating processes of a study program. Students can also comment on the quality of teaching and the work of teachers in a study program at least once a year by means of an anonymous questionnaire.

In the context of the above criteria, we have good experience with collecting anonymous student feedback after each semester (twice a year) by means of an anonymous questionnaire using the university's academic information system, in our case it is the Modular Academic Information System (MAIS) and we find it beneficial. The above example of good practice and the obtained results are specified in the following part of the paper.

4.1 Student Feedback in the Modular Academic Information System MAIS

An opportunity for gathering student feedback by means of an anonymous questionnaire is offered by using the Modular Academic Information System MAIS. Students complete the questionnaire twice a year (after each semester). The anonymous questionnaire is oriented on several fields, within which the following information are examined in details:

Part 1: Content of the subject and its implementation in the study program:

In this part, we examine students' opinions on the **significance of the subject** for their profile in the study program, on **including the subject** in their study plan, and **the interconnectedness** between subjects, opinions on **meeting the goals of the subject** from the students' point of view, on the **content of the subject in relation to their expectations**, students' opinions on the **extent of teaching considering the number of credits**, and students evaluation of the **time distribution of lectures** and the **time distribution of seminars**.

Part 2: Organization of the educational process:

Students' evaluation of **teachers' adherence to the timetable**, **adherence to the syllabus**, their opinions on **supplementing teaching time by consultations by teachers** and their opinions related to the current situation in **implementing e-learning in a particular subject** are investigated into.

Part 3: Performance assessment:

Students indicate whether they are **sufficiently informed about the assessment criteria**, whether the **assessment by teachers** is objective, they comment on formative **assessment of knowledge during the semester** and to **teachers' approaches to students' objections**.

Part 4: Staffing of the subject:

In this part of the anonymous questionnaire, students' opinions on the **teacher's expertise**, on the **clarity and comprehensibility of lectures**, **the teacher's**

creativity, how the teacher **motivates and develops students' activity during lectures**, how students evaluate motivating students by the teacher, and their opinions on creating **space for discussions** by the teacher are investigated into and an opportunity to express their **own opinions** is provided.

Part 5: Availability of resources:

In relation to resources, we are interested in whether – according to students – the **recommended literature corresponds with the content of the subject**, what is **the quality of study materials provided by teachers**, how students evaluate the **availability of recommended literature**, and students are also asked about the **availability of resources in the university library**.

Part 6: Teaching - forms, methods:

Students express their opinions on the issues of the **diversity of applied methods of teaching**, **systematicity – the logical continuity of the provided information** in a particular subject, on the **interactivity of education – students' active participation**, **demonstrations – using examples from practice and case studies**, **application of a scientific approach – integration of modern scientific knowledge and research into the subject content**, durability – **consolidating theoretical knowledge during seminars** and **practicality – existence of a link between the gained knowledge and practice**.

Part 7: Spatial and technical equipment:

In this part, we examined students' opinions on **classroom premises and equipment**, **using audio-visual devices** in the course of the educational process of a particular teaching subject, **application on modern digital teaching devices**, **using professional software during lessons**, and we were also interested in the evaluation of **internet access** by students.

Part 8:

The last part of the anonymous questionnaire provides students with space for **mentioning the most serious issues related to their studies**, making proposals for improvement, and commenting on what could increase the quality of education.

In the anonymous questionnaire, students indicate their opinions on a scale: Excellent - 1, Very well - 2, Well - 3, Sufficient - 4, Insufficiently - 5.

In the questionnaire, the following information are identified: subject, teacher, students' gender, form of study, level of study, year of study.

The data obtained from student feedback are among the observed components of the internal system of university education quality assurance by the management, which is a guarantee for considering them and for their application for the purposes of quality assurance.

Alongside with that, we recommend to provide the heads of departments with the obtained information in order to use them for the purposes of subject quality assurance in their department.

Another tool, which proved itself valuable to is in gathering feedback, is internal audits.

4.2 Feedback from Internal Audits of Ongoing Processes at the University

The goal of internal audits in the school is to assess the conformity level between the processes and the documentation of the internal system of university education quality assurance, and the ISO 9001:2015 requirements (as DTI University works in accordance with that norm); to assess the efficiency of the internal system; and to improve the internal system and its documented procedures. We consider internal audits an important tool for university education quality assurance. We find it important to monitor the results of internal audits and to be interested in new trends. We present the current results, as well as the results for previous periods since the introduction of the internal system, and we also pay attention to the trends.

4.2.1 The Trend in the Process of Education according to the Results of Internal Audits

The results of internal audits of the process Education with the trend line are displayed in Figure 2.

Trend line equation: $y = -0.3697x + 98.661$

Reliability equation: $R^2 = 0.527$

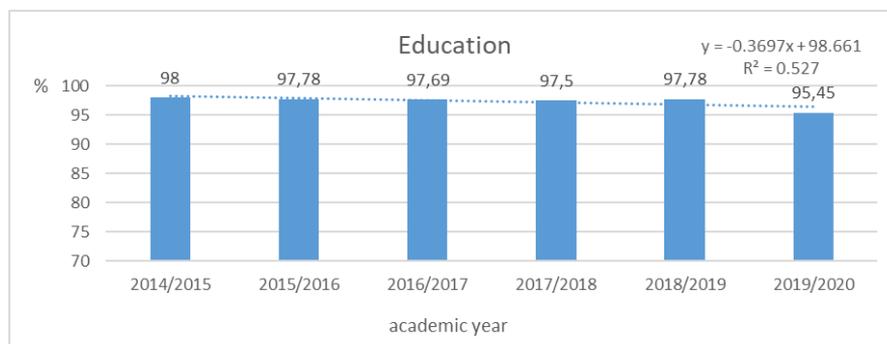


Figure 2

Results of internal audits of the process Education with the trend line

4.2.2 Trend in the Process Employee Quality

The results of internal audits of the process Employee Quality with the trend line are displayed in Figure 3.

Trend line equation: $y = 4.3563x + 74.258$

Reliability equation: $R^2 = 0.8706$

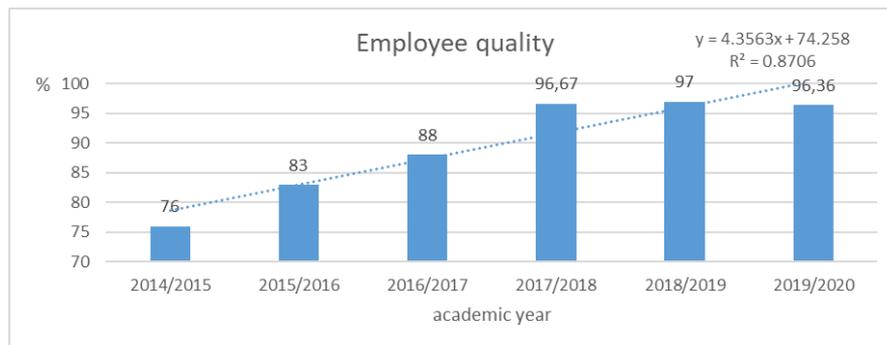


Figure 3

Results of internal audits of the process Employee Quality with the trend line

4.3 Feedback on the Realized Meetings and the Proposed Courses within the International Erasmus+ Project ENTER

In the course of the realization of the project, we were interested in DTI University students' perception of the activities carried out within it and in what their opinions on the provided courses are. We addressed third-year students in the study program Teacher Training in Practical Training.

Within the investigation, students were asked to select one of the realized project meetings (www.erasmus-enter.org, part Project Meetings) and describe what they liked about it. They were also asked to select three out of the fourteen suggested courses based on their importance (those which teachers should complete) and comment on why they find them the most important. Taking into account the extent of the paper, we present an overview of the most important findings.

The selection of meetings by students within the **ENTER** project is displayed in Table 2.

Another 27.03% of students commented on meetings without any specification of the meeting.

Table 2
Selection of meetings by students within the ENTER project

ENTER project meeting	Dates	% of students
Kick-off meeting and Preparation (Porto, Portugal)	15 th January – 18 th of January, 2019	10.81
WS1.1 - Workshop on ENTER structure and operation, WS1.3 - Workshop for developers' group (Tambov, Russian Federation)	29 th May – 31 st May, 2019	16.22
WS1.2 - Workshop on ENTER QMS and procedures WS2.1 - Workshop on iPET course development (Almaty, Kazakhstan)	18 th September – 21 st September, 2019	10.81
WS2.2- Workshop on iPET modules' contents (Bratislava, Slovakia, online)	22 nd April – 23 rd April, 2020	32.43
TR1.1 - Training of management staff on QMS (Rostov on Don, Russian Federation, online)	1 st July – 3 rd July, 2020	2.70

In Table 3 students' ranking of the proposed courses based on their importance are displayed (students were asked to select three out of fourteen courses based on their importance).

Table 3
Students' opinions on the significance of courses

Program	Course	% of students
iPET-1 (2 ECTS)	1.1 Innovations in engineering pedagogy	18.92
	1.2 Time management	29.73
	1.3 Effective interaction	45.95
iPET-2 (8 ECTS)	2.1 Enhancement of learning interactivity	35.14
	2.2 System analysis in education	13.51
	2.3 Pedagogical psychology and communication	48.65
	2.4 Interaction with stakeholders	5.41
	2.5 Sustainable development	2.70
iPET-3 (20 ECTS)	3.1 Digital education	43.24
	3.2 Problem-based, Project-based and practice-oriented learning	8.11
	3.3 Learning outcomes' assessment	8.11
	3.4 Course design	0.00
	3.5 Engineering innovation process	2.70
	3.6 Final project	0.00

8.1% of students did not specify the courses when commenting on it. The participating students were most interested in the following courses: Pedagogical psychology and communication (48.65%), Effective interaction (45.95%) and Digital education (43.24%).

We are pleased by the fact that students showed interest in the project and courses during the investigation, and they commented on the project and the courses. In the upcoming period, we will continue with other planned activities. Due to the pandemic situation, the project period was prolonged by one year, the project will finish in November 2022. Our ambition is to continue with the activities related to improving the quality of education and the quality of university teachers even after the project ends.

Conclusions

In the conclusion, our recommendations for the pedagogical practice in relation to improving the quality of education and the quality of pedagogical teacher training are listed. In order to meet the criteria, teachers must develop the above skills and competencies necessary for the provision and development of study programs, and the university should have evidence of it in the form of documents (e.g., certificates).

In the context of the above requirement, there is a wide range of options for meeting them (e.g., courses and seminars). We would like to point out three of them, which can be well applied both in Slovakia and which we consider significant in relation to university education quality and teacher quality assurance, and which are also related to the above-described realized project activities. The three options are:

Courses developing university teachers' pedagogical competencies: We encourage university teachers to take part in courses developing their pedagogical competencies, particularly programs providing pedagogical psychological training for university teachers in compliance with the requirements of the International Society for Engineering Pedagogy IGIP. The graduates of such courses for university teachers are entitled to request the international ING-PAED IGIP certificate.

Joining the ING-PAED IGIP Register and earning the degree of ING-PAED IGIP: Completion of pedagogical studies and earning the degree of ING-PAED IGIP is a means of improving the quality of teachers, i.e., also of university education quality assurance. Alongside with that, earning the degree of ING-PAED IGIP has a positive impact on the status of teachers as well.

ENTER project courses: The ENTER project, focuses on developing a new multicultural and international approach for formal post-gradual vocational and pedagogical teacher training – the ENTER iPET program. The ENTER iPET project is oriented on e-learning technologies and its ambition is to become internationally accredited. It proposes a hierarchy of three structured

educational programs for teachers in the context of the European Qualifications Framework for Lifelong Learning. We recommend university teachers' participation in educational programs, which provide opportunities for the development of their skills and competencies, increasing their quality and also the quality of university education.

Acknowledgements

The authors gratefully acknowledge the contribution of the KEGA Grant Agency of the Slovak Republic under the KEGA Project 014UKF-4/2020 "Innovative learning e-modules for safety in dual education". We also acknowledge the support of Erasmus+ project ENTER - EngineeriNg educaTors pEdagogical tRaining (Project Reference: 598506-EPP-1-2018-1-PT-EPPKA2-CBHE-JP).

References

- [1] Balogh, Z.; Fodor, K.; Magdin, M.; Francisti, J.; Koprda, Š.; Kovari, A.. Development of Available IoT Data Collection Devices to Evaluate Basic Emotions. In: *Acta Polytechnica Hungarica: An international peer-reviewed scientific journal of Óbuda University, Hungarian Academy of Engineering and IEEE Hungary Section : journal of applied sciences.* – Budapest: Obuda University. – ISSN 1785-8860. n19, no. 11 (2022), p. 165-184
- [2] Barnová, S.- Krásna, S.-Gabrhelová, G.. "E Mentoring, E Tutoring, and E-Coaching in Learning Organizations." EDULEARN19: 11th Annual International Conference of Education and New Learning Technologies, Palma de Mallorca, Spain, (2019): 6488-6498
- [3] Best practices of pedagogical engineering teachers (e-book). 2019 [online] [2020-08-13] Available on the Internet: <[http://erasmus-enter.org/files/r_1.3_-_best_practices_of_pedagogical_education_for_engineering_teachers_\(e-book\).pdf](http://erasmus-enter.org/files/r_1.3_-_best_practices_of_pedagogical_education_for_engineering_teachers_(e-book).pdf)>
- [4] Darling-Hammond, L., Chung, R., & Frelow, F. Variation in teacher preparation: How well do different pathways prepare teachers to teach? In : *Journal of Teacher Education*, 2002, 53(4), pp. 286-302
- [5] Day, C., & Kington, A. Identity, well-being and effectiveness: The emotional contexts of teaching. In : *Pedagogy, Culture & Society*, 2008, 16(1), pp. 7-23
- [6] Driensky, D. *Engineering pedagogy*. Bratislava : STU, 2007. 185 p. ISBN 978-80-8096-040-7
- [7] ENTER EngineeriNg educaTors pEdagogical tRaining [online] [cit. 2020-08-13] Available on the Internet: <www.erasmus-enter.org>
- [8] ENTER Network Design [online] [cit. 2020-08-13] Available on the Internet: <http://erasmus-enter.org/files/enter_network_design.pdf>

- [9] Feiman-Nemser, S. Teacher learning: How do teachers learn to teach? In M. Cochran-Smith, S. Feiman-Nemser, & D. McIntyre (Eds.), *Handbook of research on teacher education: Enduring questions in changing contexts*, 2008 (pp. 697-705) Routledge/Taylor & Francis
- [10] Gabrhelová, G. *Innovation in educational process*. Karlsruhe, Deutschland : Ste-Con, 2017, 68 p. ISBN 978-39-4586-2162
- [11] Grant, C. A., & Gillette, M. A candid talk to teacher educators about effectively preparing teachers who can teach everyone's children. In : *Journal of Teacher Education*, 2006, 57(3), pp. 292-299
- [12] Hamman, D., Gosselin, K., Romano, J., & Bunuan, R. Using possible-selves theory to understand the identity development of new teachers. In : *Teaching and Teacher Education*, 2010, 26, pp. 1349-1361
- [13] Hargaš, J. *School quality*. Dubnica nad Váhom : DTI University, 2020, 109 p. ISBN 978-80-8222-011-0
- [14] Holbert, R. M. G. Classroom community and possible selves: Implications for midcareer teacher seminars. In : *Teachers and Teaching*, 2015, 21(1), pp. 44-60
- [15] Hollins, E. R. Teacher preparation for quality teaching. In : *Journal of Teacher Education*, 2011, 62(4), pp. 395-407
- [16] Hrmó, R., Krpáľková Krelová, K. Pedagogical training of university teachers according to the International Society for Engineering Pedagogy (IGIP) standards at the Faculty of Materials Science and Technology of Slovak University of Technology in Bratislava based in Trnava. In : *Adult education*, ISSN 1335-2350, 2007, 12(3), pp. 79-86
- [17] IGIP [online] [2020-08-11] Available on the Internet: <<http://www.igip.org/>>
- [18] ING-PAED IGIP [online] [2020-08-11] Available on the Internet: <<https://kip.tuke.sk/pre-uchadzacov/ing-paed-igip>>
- [19] Katariina, S., Liisa, K., Harri, P., & Katriina, M. Beginning student teachers' teacher identities based on their practical theories. In : *European Journal of Teacher Education*, 2014, 37(2), pp. 204-219
- [20] Molnár, Gy.; Fodor, A.. The impact of digitization on modern methodological pedagogic practice. In: Temesvári, Zs.; Wühl, T.; Molnár, Gy. (eds.) XXXVIII. Kandó Conference 2022 . Budapest, Hungary : Obuda University, Kandó Kálmán Electrotechnical Faculty (2022) 419 p. pp. 125-143, 19 p.
- [21] Molnár, Gy.; Szűts, Z. Use of Artificial Intelligence in Electronic Learning Environments. In: Molnár, Gy. (eds.) IEEE 5th International Conference and Workshop in Óbuda on Electrical and Power Engineering (CANDO-EPE 2022) Budapest, Hungary : IEEE (2022) pp. 137-140, 4 p.

-
- [22] Szököl, I. 2016. Educational evaluation in contemporary schools. Szeged: Belvedere Meridionale, 2016, 159, p., ISBN 978-615-5372-60-5
- [23] Szűts, Z.; Molnár, Gy.; Racsko, R.; Vaughan, G.; Lengyelne Molnár, T.. Pedagogical Implications and Methodological Possibilities of Digital Transformation in Digital Education after the COVID-19 Epidemic COMPUTERS 12 : 4 Paper: 73 , 19 p. (2023)
- [24] Quadrado, J. C., Galikhanov, M. F., Zaitseva, K. K. Sustainable Development Principles for Engineering Educator. In : Vysshee obrazovanie v Rossii = Higher Education in Russia, 2020, Vol. 29, No. 6, pp. 75-82
- [25] Tabak, B. Y., Yenel, K., Tabak, H., Şahin, F. Prospective Teachers' Expectations and Concerns About the Future: Using Possible Selves Theory. In : Journal of Education, 2020, Vol. 201, issue 2, pp. 71-85
- [26] Trent, J. "Four Years on, I'm Ready to Teach": Teacher education and the construction of teacher identities. In : Teachers and Teaching, 2011, 17(5), pp. 529-543
- [27] Turek, I. Didactics. Bratislava : Iura Edition, Ltd., member of Wolters Kluwer Group, 2010. 598 p., ISBN 978-80-8078-322-8
- [28] Tureková, I., Bilčíková, J., Bilčík, A., Marková, I. Implementation of Environmental Issues in Teaching the Subject of Technical Education at Primary Schools. In: International Journal of Engineering Pedagogy. Vien : International Association of Online Engineering. ISSN (online) 2192-4880, 2020, 10(4), pp. 93-107
- [29] Ugrai, J. (2020) Going on Their Own Way. Protestants' Specific Models of Joining the Cultural Elite in 19th-century Hungary. In: Espacio, Tiempo y Educación. 2020 (7) 2, 119-133, doi: [http:// dx.doi.org/10.14516/ete.243](http://dx.doi.org/10.14516/ete.243)
- [30] Walkington, J. Becoming a teacher: Encouraging development of teacher identity through reflective practice. In : AsiaPacific Journal of Teacher Education, 2005, 33(1), pp. 53-64