

TRENDS AND COMPETENCIES IN VOCATIONAL EDUCATION

Petr Adamec
Michal Šimáně
Martina Miškelová (Eds.)



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INTRODUCTION

Petr Adamec, Michal Šimáně, Martina Miškelová

It has been more than ten years¹ since the term Fourth Industrial Revolution (4IR), or Industry 4.0, has been enriching both, lay and especially professional discussions, in connection with various areas of human life. Unsurprisingly. The massive development of digital technologies, robotics, the Internet of Things (IoT) or virtual reality accelerated and intensified by the global pandemic of the COVID-19 disease and currently, for example, the economic crisis accompanied by high inflation in many countries worldwide, represents enormous changes in all spheres of society. And similar to any other change, this change is also accompanied by a call for new thinking, new behaviour, new direction or new practices, both, on the part of the entire society, and on the part of individuals as well (see Chaka, 2020). Concurrently, however, these developments raise a number of questions and various issues. In general, there are a number of challenges to be addressed in society. Simply put; the search for a *modus vivendi* with the “new world”.

Efforts to find new solutions and adapt to current and future developments also affect the field of education and training. After all, it is no coincidence that the concept of the Fourth Industrial revolution, i.e. Industry 4.0, has become a “popular” or even a “fashionable” term in this area as well, to such an extent that a completely new term, Education 4.0, has been established in pedagogy and related sciences, which emphasizes precisely the aforementioned wide and far-reaching changes in the contemporary world². Similar to other sectors of society, education must therefore cope with a huge transformational, turbulent and even disruptive force in a very short time. And all this in a situation where the changes triggered by Industry 4.0 processes are essentially unpredictable (see e.g. Kuper, 2020 for more details). This requires an emphasis on innovation from all actors in education and training – not only from traditional stakeholders such as pupils and students, but also from educators, management of educational institutions, politicians and many other actors influencing school and educational life. Innovations that will not only help to adapt education to current trends in the field of Industry 4.0, but ideally will also help prepare future generations for the trends that development will bring in the coming years, if not decades.

1 Specifically, since 2011, as reported for example by Grabowska, Saniuk a Gajdzik (2022).

2 For more information on the issue of the term Education 4.0 see e.g. Salmon (2019).

It is obvious that these are very difficult tasks the contemporary education and training is facing. In this respect, completely new demands are placed on the individual actors of education, compared to relatively recent times, which are reflected in newly conceived educational curricula, in the focus on new competences, both for pupils and students, as well as educators, and further also, for example, in the emphasis on the necessity of informal and lifelong education and informal learning (cf. e.g. Goller, Caruso, & Harteis, 2021; Chaka, 2020; Kift, 2021; Matsumoto-Royo, Ramírez-Montoya, & Conget, 2021). Coincidentally, however, there are voices calling for a certain humanization and sustainability of the entire process of “adaptation” to new conditions. In other words, the so-called Industry 5.0 concept, the essence of which is the return of the human factor to industry. Or rather, the increase in cooperation between people and intelligent production systems and combining the best of the two worlds – speed and accuracy guaranteed by automation with human cognitive abilities and critical thinking (Grabowska, Saniuk, & Gajdzik, 2022).

A specific area of education – vocational education – is in an interesting position in this context. Compared to general educational curricula, the vocational education curriculum has to cope with changes in the content of education itself in a more significant way. This is due to the current changes, but also to certain turbulences and the unpredictability of further developments in the industrial sector, which vocational education must emphasize much more than other areas of education. It is therefore extremely interesting to observe what current trends, what questions and what topics are currently being addressed in the field of vocational education. And exactly this topic is also the focus of this book.

The following thirteen texts elaborate the topic of contemporary vocational education and training within the framework of the so-called Visegrad Four. In other words, the authors include Czech, Hungarian, Polish and Slovak experts. From the point of view of vocational education, these are countries where, with the exception of Hungary, the number of pupils in upper-secondary schools exceeds the European Union (EU) average. While the average number of pupils in vocational education at the level of upper-secondary schools in 2017 was 47.3% in the EU, it was 73.2% in the Czech Republic, 69% in Slovakia and 50.5% in Poland (Statistical overviews on VET – Czech Republic, 2017; Statistical overviews on VET – Poland, 2017; Statistical overviews on VET – Slovakia, 2017). Only in Hungary, the number of upper-secondary school pupils in 2017 was just 23.2%, which is, of course, due to the slightly different system of vocational education in this country and, at the same time, due to a different interpretation of internationally agreed definitions (Statistical overviews on VET – Hungary, 2017). In any case, it is a European region that is significantly specific in this respect due to its high number of vocational education pupils, and a look

“behind the scenes” of vocational education in these countries can yield some interesting insights.

The topics of the book are divided into four areas. The first area, entitled *The Changing World of Vocational Education – Development, New Challenges and Opportunities*, contains two texts. To begin with, the Polish author **Renata Tomaszewska** concentrates on the general issue of the Fourth Industrial Revolution, Industry 4.0, and the resulting implications for the field of education; in particular, the transformation of competencies important for education and life in the following years. The second text by Hungarian author **Lajos Somogyvári** provides a historical perspective on the development of vocational education in Hungary. In a broader context, his text reveals, among other things, the reasons why in countries with a socialist experience (such as the Visegrad Four countries) the emphasis on vocational education still prevails in a significant way.

The other parts of the book deal with more specific topics. Explicitly, the second one focuses on *The Role of Developing Professional and Soft Competencies for Vocational Education*. A total of three chapters are part of this section. The first of them, by Czech author **Markéta Švamberg Šauerová**, deals with building one’s own social capital – the so-called life skills. At the same time, the author focuses on the integration of these basic life skills into a comprehensive system of competencies of pedagogical staff and presents selected techniques that can be used in teacher education. The second chapter of this part by Slovak authors **Zuzana Geršicová, Silvia Barnová and Slávka Krásna** presents the research based partly on the method of experiment which focuses on the area of development of personal and social skills in a broader context. Specifically, the centre of their attention are vocational school teachers and their undergraduate training using appropriate teaching methods and strategies. The last chapter of this part of the book by Czech authors **David Kryštof and Petr Adamec** presents an interesting perspective on the development of teachers’ competencies through the psychological approach of transactional analysis, which the authors have applied in the field of vocational education as part of their research activities.

The third part of the book, entitled *Approaches to the Sustainability of Quality Vocational Education in the Digital Age*, is devoted mainly to the issue of digital competencies and digital technologies in vocational education. This part of the publication consists of four chapters. The introductory chapter by Czech author **Čestmír Serafin** addresses the issue of digital literacy in the context of Czech schooling. At the same time, the author pays special attention, for example, to cross-sectional competencies, digitization, system links and connections in the teacher’s competence model. Czech authors **Kateřina Tomešková and Petr Svoboda** follow up on this text with a chapter in which they deal with the issue of “reviving” teaching at a technically oriented university through modern

approaches. They based their qualitative research among university students mainly on the experience they gained through teaching in MS Teams tool during the course of the COVID-19 pandemic. The third text in this part of the book is a chapter by the Czech-Slovak duo of authors **Pavel Pecina and Peter Marinič**. The authors address the issue of the competencies of teachers of vocational subjects to prepare, implement and evaluate problem-based and research-oriented teaching against the background of the ever-evolving conditions of digital education and artificial intelligence. The third part of the book concludes with a text by another Czech author, **Jaroslav Lindr**, who presents the results of his research focused on the quality of teaching in connection with the fulfilment of the key competencies of a technical university graduate on the example of two subjects: Presentation skills and Mathematics.

The last, fourth part of this collective monograph concludes with a topic entitled *Selected Aspects Affecting Key Actors in Vocational Education*. As in the previous part, this one also contains a total of four chapters. The first of them, by Czech authors **Eva Urbanová and Jana Marie Šafránková**, concentrates on Czech secondary school principals. Specifically, within the framework of the research described in the text, the authors were interested in the answer to the question whether the activities performed by the high school principals themselves belong to the roles primarily associated with strategic and conceptual activities, and at the same time, whether the delegated activities are more related to operational and administrative activities. Furthermore, they point to the fact that school management requires an interdisciplinary approach, which, in addition to general managerial knowledge, also uses knowledge from pedagogy, psychology, sociology, legal and economic disciplines, et cetera. The next chapter was prepared by a Czech-Slovak team of authors **Helena Zelníčková, David Vorel, Ludmila Rumanová and Peter Marinič**. The main topic of their text is the integration of elements of the dual education system into teaching at secondary vocational schools in the Czech Republic as an effective form of the teaching process organization, which systematically prepares pupils for future careers in a real business environment. The penultimate chapters of this part, dedicated to the key actors of vocational education, approach the issue of diverse roles and activities of the lecturer in the context of further education of university teachers. Specifically, Slovak author **Jana Trabalíková** further investigates how teachers perceive the usefulness of training in selected areas of their pedagogical competences and what the lecturer's activities are during the course. The fourth part, as well as the whole book, is concluded by another Slovak author, **Tímea Šeben Zátková**, with a text in which she assesses the changes in the agricultural teachers' education in the Slovak Republic in the context of socio-economic transformation processes. In this regard, the chapter focuses, for example, on a brief summary of selected contexts in the development of teacher training,

a description of changes in the number of agricultural schools in Slovakia, but also on a description of changes in the number of teacher training graduates for the agricultural field.

In conclusion, we would only like to add that we are aware of the limits of this publication, its certain incompleteness, for example regarding the presented topics. However, our ambition was not to cover the complexity of current vocational education, current trends in all its dimensions, et cetera. This, after all, is not even possible within the scope of one monograph. The topics presented are mainly based on the professional interest of the authors we have approached and provide a partial, but in our opinion an interesting insight into vocational education in a defined European region with unique experience in this specific field of education.

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1

**THE CHANGING WORLD
OF VOCATIONAL
EDUCATION –
DEVELOPMENTS,
NEW CHALLENGES
AND OPPORTUNITIES**

1.1

Towards competence 4.0 new challenges for education

Renata Tomaszewska

Introduction

We are in a particular period of leapfrogging economic, technological, legal, business and social changes that are leading traditional industry to the model of the fourth industrial revolution and Industry 4.0. The development and dissemination of new digital technologies, machine learning and artificial intelligence generates the need to define and determine the competencies necessary to live and work in the third decade of the 21st century. This chapter in the book will be devoted to the so-called competencies 4.0, i.e. competencies of the digital era, which are particularly important from the point of view of professional education.

When reflecting upon vocational education in the 21st century and the needs of organisations in terms of professional preparation of candidates for work and their employees, it is necessary to start from the fact that we are in a special period of change related to the development of digital technologies. This is true for the Czech Republic, Slovakia, Poland and Hungary, as well as for all developing and highly developed countries. The last 2 years marked by the global epidemiological situation have proven that issues such as digital transformation, remote working, robotisation and automation are not just a vision of the future. The outbreak of a pandemic and the associated restrictions meant that schools and institutions at all levels of education, economic and business organisations, as well as pupils, students and employees themselves were able, in a fairly short period of time, to implement and use modern technological solutions in their activities and operate in a remote system and in a virtual world. The pandemic proved at least two important points: that nothing is impossible in terms of implementing digitisation, automation or robotisation, and that many individuals and organisations have a strong capacity to adapt quickly to unforeseen changes in both the education and labour markets.

In light of the above, this chapter addresses the issue of the competences of the digital age, the so-called competences 4.0, which are at the same time a challenge for education systems around the world, especially for vocational education systems.

1.1.1 Competences of the digital age: 4.0

The world has entered another industrial revolution. The first one was driven by steam engines, the second by the invention of electricity, and the third by electronics and the development of information technology. The *fourth revolution*, which is now unfolding, is not just a follow-up to the previous one, but a new phenomenon that is fundamentally changing many aspects of our lives –

from the economic and political to the everyday. It is driven by technological developments that result in an ever-increasing blending of the digital and physical worlds (the so-called 'new new technologies'). The main differences between the fourth revolution and the third revolution initiated in 1969 are: universal access to the Internet, reduction in the cost of data storage (storing 1GB of data in 1995 cost about \$10,000/year, now it costs 3 cents per year), mobility of devices, smart sensors reacting to human presence, renewable energy sources, and artificial intelligence and machine learning (Tomaszewska, 2020a, pp. 154-155).

The fourth industrial revolution will be more rapid than the previous ones, which is due to the pace of technological development. We are witnessing an increase in the computing capacity of supercomputers (more than 3,500% increase between 2000 and 2018) and a reduction in the aforementioned cost of data storage by as much as 99.5% (also between 2000 and 2018). These events have led to a rapid increase in the amount of data (80% of data in the history of the world was created between 2015 and 2018) and an increase in the number of devices connected to the network (it is estimated that in 2020 there will be over 50 billion of them, which is several times more than the population of the Earth). The increase in the amount of data indicated in the chapter, and the surge in the computing power of computers have meant that today machines are able to move in space, in both predictable and unpredictable manners. In turn, this enabled the emergence of autonomous cars, drones and robots. Increasingly, computers are also carrying out many of the activities that people previously had to do. Such great civilisational transformations are not indifferent to *education* systems all over the world, at every level, and especially for *vocational education*. They also have a huge impact on the labour market. The inevitability of eliminating more professions seems certain, and strategies for social adaptation to these changes appear particularly urgent (McKinsey & Company, 2018).

Competences of the digital era, the so called *4.0 competences*, will play a key role in the process of transition to digital transformation of the world, which we call *Industry 4.0*. These competences include not only traditionally understood technical skills, but also - equally important - soft competences, including transversal skills (transferable regardless of the type of work actually performed at a given moment). The development and dissemination of digital technologies, machine learning and artificial intelligence generates the necessity to create a new definition of competences, necessary to live and work in the current era of civilization changes. In a strict sense, the existing definitions of digital competencies are strongly connected with the traditional understanding of information and communication technologies. Meanwhile, in their emerging new definition, it is necessary to synergize transversal skills with traditionally defined digital skills, as well as to place emphasis on shaping proactive and

approving attitudes towards various manifestations of the digital world. The category of transversal competences should be understood as a whole package of competences: social, civic, media, communication, interpersonal, critical and innovative thinking, group work, etc. For the purpose of analyses related to relations between competences of the digital era and development of the 4th industrial revolution, in the broader sense, digital competencies may be defined as competences 4.0, i.e. interrelated competences: functional and professional (IT) digital skills and knowledge;

- social skills, e.g. problem-solving skills, leadership,
- intrapersonal skills, e.g. learning to learn, self-discipline, perseverance, self-motivation, critical thinking,
- interpersonal skills, e.g. communication, organisation, teamwork,
- media skills, e.g. critical analysis and evaluation of information,
- attitudes which are proactive and approving of the digital world – open to activity in this domain (Głomb, 2020, pp. 21-24, 83-84).

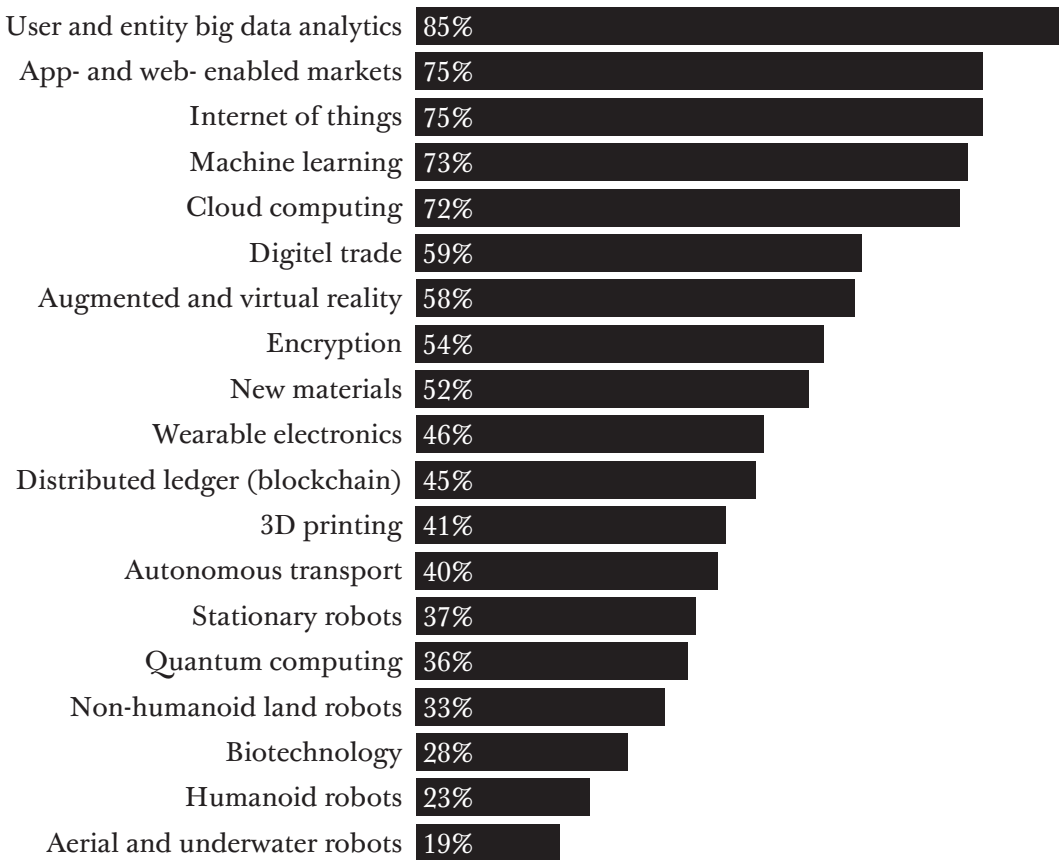
In the proposed view, technical competences are a natural environment for the use of the soft competences “immersed” in them. Such a broad approach to competences of the digital era is connected in a practical way with the issues of the development of Industry 4.0, in which the creativity, effectiveness and efficiency of individuals play an important role. Such an approach also allows to include issues related to the deficit of soft competences and to better plan activities in the field of formal education and development and dissemination of competences directly oriented to the needs of the future labour market.

Industry 4.0 poses qualitatively new challenges to the acquisition of knowledge and skills, as well as the adaptation of attitudes to the changing conditions of production and distribution. Working in conditions of dynamic development of emerging technologies (artificial intelligence, big data, Internet of Things, quantum computers, cloud computing and many others) requires appropriately adapted competences, going beyond the aforementioned technical digital competencies, which have so far been considered key (Głomb, 2020, pp. 83-84). According to a 2018 report by the World Economic Forum, nearly 55% of the employed were then expected to require significant training by 2022 to upgrade or acquire new skills (Future of Jobs Survey, 2018). Therefore, educational measures of a similar scale to those already in place and in the current school model will not suffice. In the third decade of the 21st century, automation and robotisation of manufacturing processes are expected to become widespread in the economies of developed countries and parts of developing countries. The impact of these phenomena on the labour market – meaning the elimination of some professions in the 2030 perspective – will be significant. Automation and robotisation will

affect the tasks performed primarily in the workplace rather than the entire manufacturing process. According to some estimates, these processes will cover 45% of current occupations in the period under consideration. The expected implementation of digital technologies in organisations in 2022 is illustrated in Graph 1:

Graph 1

Technologies by proportion of companies likely to adopt them by 2022 (projected)



Source: Future of Jobs Survey 2018, World Economic Forum (2018, p. 7)

A fundamental feature of the new generation industry is the emergence of new technological domains requiring specific competences in such areas as the integration of cyber-physical systems, advanced production management systems, advanced robotisation, integration of analytical cloud systems with local systems, operation of complex production data analysis systems or application of artificial intelligence algorithms in the production space. New areas of activity require specific methods of implementation and problem solving, which in

turn entail the need to acquire and develop the above-mentioned transversal competences, e.g.:

- effective group work, in a virtual team, in an international environment, etc.,
- interpersonal – leadership, communication, convincing others of one’s opinions, motivating team members,
- processing and analysing large amounts of data from multiple sources,
- assessing the relevance and reliability of information, as well as making conclusions on the basis of information,
- accessing information, with the use of electronic media and big data tools, etc. (Głomb, 2020, pp. 58–60).

The automation of production and solutions based on artificial intelligence will also eliminate many employee activities related to machine operation and maintenance, as well as resource management. At the same time, the demand for cognitive skills is expected to increase as an important element of professional competency. According to the experts of the cited World Economic Forum, the most important three skills of Industry 4.0 employees are: cognitive abilities, system skills and the ability to solve complex problems. The demand for them will grow and their importance will remain high. Experts further expand the palette of soft skills (the demand for which will significantly increase in the coming years) to include critical thinking, creativity and originality, the ability to pay attention to detail, problem solving and people management. The importance of transversal skills, including so-called personal skills, for the employees of Industry 4.0 has been assessed by experts to be on a par with the possession of basic technical know-how, which constitutes the traditional package of employee competencies (Future of Jobs Survey, 2018).

It is worth noting that in the literature there is also the concept of *competencies of the future*. In the conditions of digital transformation, knowledge has become the most important resource, and the key competency of individuals and organisations – has been the way and speed of acquiring and applying it. On the labour market – increasingly shaped by automation and platformisation processes – there will be employees who will rely primarily on advanced competences that distinguish human work from the work of IT systems, robots or artificial intelligence. They are the ones that are becoming crucial, because in these areas humans will still be difficult to replace. They have been called *the competencies of the future*. Such competencies are specific skills that make it possible to undertake and carry out tasks in a work environment that is fundamentally flexible, geographically dispersed, prone to frequent and rapid change, involving digital technologies and cooperation with automated systems and machines using artificial intelligence. In this context it is worthwhile to talk about competences,

which are understood in a broader sense and are connected with the development of specific attitudes, ways of thinking, learning and acting, rather than about specific, learned skills, the set of which, in the face of the aforementioned changes, will be constantly modified (Włoch & Śledziwska, 2019, pp. 16-17).

According to McKinsey analysts, the concept of *competencies of the future* can be referred to the following three groups:

1. technical and digital competences:

- advanced (i.e., understanding advanced digital technologies, being able to develop and adapt them) – by 2030, Europe’s workforce will spend over 40% more time on activities using these competencies; they will be few and far between and demand for advanced digital and software skills will increase by 90%,
- basic skills (i.e., the ability to use digital technologies in everyday work, especially problem solving and information retrieval): in Europe, demand will increase by 65% by 2030,

2. social competences: by 2030, demand on the European labour market will increase by 22%, the fastest growth, by 1/3, will be in demand for entrepreneurship and the ability to take initiative,

3. higher cognitive competences: the demand for them will increase by 14% by 2030 (including basic skills in data processing) will decline – in Europe by as much as by 23% by 2030) (Bughin et al., 2018; Włoch & Śledziwska, 2019, p. 16).

It should be added that the set of competences defined in this way is often referred to as *metacompetences* or the transferable competences already mentioned several times, invariably relevant from the perspective of employers in the digital economy (Włoch & Śledziwska, 2019, p. 17).

Identification and description of competences that will be necessary in the foreseeable future is a very complex problem and, above all, a challenge for both schools and non-school educational institutions, especially in the field of vocational education. It is undoubtedly not an easy thing; it may eventually prove impossible. The term *competencies of the future* refers to the foreseeable directions of civilisation changes, which will concern all spheres of life. And although forecasting them in the long term is a task for authors of futuristic novels, thinking about the *competencies of the future* makes profound educational sense – it allows for appropriate designing of the educational process, but also makes one aware of the need for constant learning, autonomous and responsible reaction to the dynamically changing situation. Moreover, if we assume that the *change* is the sign of the future, then the basic – future-oriented competence is undoubtedly the ability to effectively respond to the emerging new elements of reality. This requires the development of a kind of superior competence, which is

characterised not only by readiness for change, but also active participation in its creation, and then in solving problems (tensions) appearing inevitably at the junction of the old and new social and economic order. Taking into account the obvious risk of making a mistake, we can already point to those areas of education that will have the strongest impact on shaping the *competencies of the future*. They include, first of all, *formal education – school and academic education*. It is the foundation of knowledge, skills and social competences, which in turn determine the effectiveness of *non-formal* and *informal education*. A high level of this type of education, correlated with adequate motivation and with the ability to set educational goals and to design routes leading to achieving them, is a guarantee of a smooth transition from competences needed “here and now” to the as yet undefined *competencies of the future*. However, pointing to the growing importance of formal education is only a step, bringing us closer to a very general vision of *competencies of the future*. Basing on the prognoses concerning professional areas, one can be extremely cautious in formulating forecasts describing the needs of the labour market in the coming years, important from the point of view of professional education. For understandable reasons, it is most difficult to refer to elements of competences resulting from knowledge and skills. It is slightly easier to predict the demand for social competences, which are not directly dependent on the development of technology or techniques. With these limitations, the *competencies of the future* corresponding to the needs of “tomorrow’s work” may include, for example:

- general competencies acquired during formal education (the highest possible level of linguistic, mathematical, digital, social and civic competencies),
- general occupational competencies (specific to formal education), common to groups of professions (design, development of procedures for project implementation, extensive use of IT tools, teamwork, team building and work management),
- professional competencies resulting from the need to carry out professional tasks (initially the domain of formal education, and at a later stage of non-formal and informal education), area-specific (sector-specific),
- specific professional competencies related to: the possibility of transformation of professional skills (along with technological changes), integration of knowledge and professional skills from different areas (branches) – mechanics and electronics, IT and medicine, IT and environment, chemistry and medicine, biology and technical sciences, etc.,
- general social competencies acquired through interaction with others in social and professional life (communication – formulation, transmission/reception of verbal and non-verbal messages, self-presentation, conflict resolution, exerting social influence, negotiation, cooperation in a group, including a multicultural one, organisation of own work, playing various social roles),

- specific social (personal) competencies such as empathy, problem solving, creativity, flexibility of thinking, emotional intelligence, moral maturity, ethicality, courage, openness to change, time management, learning skills, leadership (Kwiatkowski, 2018, pp. 23–27).

To conclude this part of the discussion, we may also refer to the report “Future Work Skills 2020” prepared by the Institute for the Future for the Research Institute of the University of Phoenix. It indicates the following professional *competencies of the future*:

1. sense-making, discovering sense and assigning meaning (the ability to determine the deeper meaning, or significance, of what is expressed),
2. social intelligence (the ability to relate to others in a deep and direct way, being able to sense and stimulate reactions and desired interactions),
3. novel and adaptive thinking (proficiency in thinking and finding answers beyond the usual routines and patterns),
4. cross-cultural competence (ability to operate in different cultural environments),
5. computational thinking (ability to translate large amounts of data into abstract concepts and to draw conclusions based on them),
6. new media literacy (ability to critically evaluate and develop content using new media forms and to use these media to communicate in a perspectival manner),
7. transdisciplinarity (knowledge and understanding of concepts from different disciplines),
8. design mindset (ability to devise and implement tasks and procedures in such a way as to achieve desired results),
9. cognitive load management (ability to distinguish and filter information for importance and understand how to maximize cognitive functioning using a variety of tools and techniques),
10. virtual collaboration (ability to work productively, engage and demonstrate presence as a member of a virtual team) (Future Work Skills, 2020).

These professional *competencies of the future* represent a challenge for schools and wider educational institutions at all levels, as well as for business and government organisations. Increasingly, individuals will be expected to continually assess the skills they need and quickly find the right sources and resources to develop and refresh them. They must therefore be ready for the lifelong learning that is becoming an integral part of biographies and human careers in this century.

In light of the above, it is worth emphasizing, moving on to the second part of the chapter, that contemporary schools at both primary, secondary and tertiary levels are a “product” of the technical infrastructure and social situation of

the past (Zatoński, 2020). Features of this traditional model are also imitated in institutions of vocational post-school education. However, in the face of a radically changing reality, they should adapt to new conditions in order to fulfil their mission. They already face completely new challenges.

1.1.2 Selected directions of proposed changes in education

The changes taking place in the sphere of work under the influence of the fourth industrial revolution are reflected in the educational needs of the new generations. They necessitate transformations at every level of education, especially vocational education, to ensure that young people's knowledge, skills and competences are properly adapted to the conditions of Industry 4.0.

For over three hundred years, the Western thought has been dominated by industrialism, and mass education systems were designed to mould students according to specific requirements. The organisation of the education system in the 18th century was designed to create an efficient workforce to support the Industrial Revolution. The very word "industrial" itself comes from "industrious" and refers to the attitude that accompanied the emerging market economy and became necessary for its effective development. As the first industrial revolution gathered pace at the end of the 18th century, employers began to evaluate industriousness in terms of productivity, which became the main characteristic defining human behaviour. Young people were educated for eight generations precisely on the basis of this Enlightenment belief in human nature. In the nineteenth and twentieth centuries, on the other hand, the *school* was meant to instil discipline and submission to rules, and thus the basic virtues in the labour market for the needs of big industry and later global corporations and automating factories (Rifkin, 2012, pp. 315–349).

This concept of linear/mechanical education is still valid today, despite the fact that since 2011 the fourth industrial revolution – mentioned in the first part of this chapter – and the fifth generation mobile technology (the so-called 5G) have been spreading³. The new technological revolution, combining the physical world with the digital world, requires preparing the next generations of workers

3 The term (originally Industrie 4.0) comes from the German government's draft high tech strategy promoting the computerisation of manufacturing processes and was first used at the Hanover Fair in 2011 See: Industrie 4.0: Mit dem Internet der Dinge auf dem Weg zur 4. industriellen Revolution, VDI-Nachrichten, April 2011 [accessed:27.02. 2016]. In June 2019, the Ministry of Digitalisation published and made available for free download a White Paper prepared by the Institute of Communications – National Research Institute on the 5G standard entitled „Electromagnetic field and man. On physics, biology, medicine, standards and 5G networks”.

to fully participate in it. The watchword accompanying the forecasts concerning the future of work is the formula “Brain instead of muscles”. (Tomaszewska, 2020b, pp. 299–315).

Meanwhile, to this day, the world has an education designed as a linear series of stages, from primary through secondary schools to higher education. Also to this day, pupils are divided into groups according to their age and go through the education process in batches distinguished by their date of birth. Of course, there are some differences in the structure and organisation of education from country to country, but even so, in most of them, the assessment systems determine who takes which path and when. Secondary schools and colleges, like a typical industrial factory, are still organised on the principle of division of labour, with the day divided into equal time segments. These principles work well in the manufacturing of products, but applied to the education of people they can cause all sorts of problems, such as the ones Ken Robinson and Lou Aronica write about:

- in a culture of subordination, creativity and imagination are actively discouraged, and students are sometimes even stigmatised for such qualities,
- teaching in age groups assumes that their most important characteristic in common is their date of birth rather than their natural abilities or rate of development,
- preoccupation with particular subjects and types of ability means that other talents and interests of pupils and students are almost systematically marginalised. In their place, there is a lack of commitment and low self-esteem. Those who feel alienated by the system of standardisation and examination often pay the price in terms of future unemployment and poverty (Robinson & Aronica, 2015, pp. 66–70).

As a result, today’s education systems, including vocational education, continue to place restrictions on how teachers teach and how students learn. This approach to education stifles some of the most important abilities that young people today need to cope in an increasingly demanding world – it stifles the powers of creative thinking and kills the motivation to learn. And yet, creativity is recognised as one of the key *competencies of the future*. It seems that the main reason why so many education systems continue to function in this way is the above mentioned conviction of the need to prepare young people for obedient and productive work. However, in the 21st century, employment and competitiveness in the labour market depend on those values and abilities that these systems do not take into account at all. Companies all over the world report the need for creative and independent thinking employees. To understand the need for transformation, K. Robinson and L. Aronica suggest comparing quality assurance

processes in two very different fields: education and the catering industry. There are two distinct models of quality assurance in the catering industry:

1. “Fast-food model” in which the quality of the food is guaranteed because it is standard. Fast-food chains define exactly what should be on the menu in all their outlets. They determine what the décor of the premises should be what the staff should wear.
2. The “Michelin Guide”, which defines specific criteria for excellence but does not indicate how a restaurant should meet them, so it is up to each individual restaurant to meet them. It is therefore up to each restaurant individually to meet them in the way they think is best. Such restaurants are judged not by some impersonal standard, but by experts. As a result, each is unique, although different from one another.

As the cited authors point out, one of the fundamental problems in education is that most countries subject their schools to a fast-food model of quality assurance, whereas they should be adopting the Michelin model. The future of education lies not in standardisation but in individual adaptation; not in promoting groupthink and ‘de-individualisation’ but in cultivating the true depth and dynamism of all kinds of human capacities. Only then will it be possible to realise its fundamental objectives in line with the challenges of the 21st century. (Robinson & Aronica, 2012, pp. 24–30, 205–213).

According to scientific forecasts, in the next decade intelligent machines will enter all areas of life – from offices, factories and homes, moving workers away from routine and repetitive work, and necessitating the development of human-machine relationships that support our abilities. This will lead to a radical change in the expectations of human skills. We can therefore speak of new competences needed to survive in a world defined by technology. From the perspective of schools and educational institutions, these challenges imply the need to respond to new needs and to set directions, such as the development of critical thinking skills; analytical abilities; insight into various problems; reading social signals and reacting adaptively to them. It is not only the work ecosystem that is changing. The learning ecosystem must also change (Solarczyk-Ambrozik, 2020, pp. 180–186). It is necessary to focus on shaping specific competences and developing specific character traits rather than imparting purely school or academic knowledge. In addition, the faster one increases one’s knowledge in a given field, the more important it becomes to understand the structural and conceptual foundations of the discipline (*know how*) rather than the mere mastery of content with a limited useful life (*know what*) (Schleicher, 2019, p. 158). At home, in public places and at work, we will function surrounded by increasingly complex digital systems that form the Internet of Things, mobile robots and smart machines. These will enable people to work more efficiently,

make better decisions with less risk of error. In a digitising economy, the ability of humans and machines to work together in a complementary way is becoming increasingly important. Certainly, the development of artificial intelligence is also changing the direction of human cognitive abilities, as smartphones and other mobile devices are becoming the handy repository of our working memory. Young people, in particular, no longer see the need to memorise large amounts of facts when they can access them all the time. In this context, the already mentioned skills of: assessing the credibility of sources of knowledge; interpreting facts, especially in the situation of contradictory reports; logical thinking; concentration in the situation of many distracting factors and, above all, the recommended ability to cooperate with machines, computer systems and artificial intelligence will be of key importance (Career Management 2020, p. 46).

The traditional model of teacher-student relations, useful in the unified education of discipline needed in the army and industrial factories of previous eras, is therefore counter-productive. Economy 4.0 needs diversified schools, including vocational schools, graduated by people who are curious about the world and open to new knowledge. Without this, it will not be possible to effectively update rapidly ageing skills and knowledge within the framework of lifelong learning systems. An evolutionary process of implementation of modern activating teaching methods, adjusted to specific interests and abilities of pupils, students and listeners is also necessary. It is known from research to date that it is more effective to strengthen the natural predispositions of an individual and to stimulate their general activity and curiosity (Tworóg & Mieczkowski, 2019, pp. 52-53). The postulated directions of change should include, among others:

- integrating new media literacy into educational programmes,
- incorporating experiential learning, which emphasises the importance of soft skills such as cooperation, teamwork, reading social cues and adaptive response,
- organising interdisciplinary forms of education that help develop skills and cross-curricular knowledge,
- widening the circle of learners, as people of all ages learn (Zatoński, 2020).

The pace of technological progress changes the nature of human labour forever. Therefore, in the processes of modern education, which responds to the needs of the economy, it is necessary to develop the competences of the digital era, as indicated in the first part of the chapter, i.e. the competences 4.0. Two broad groups of skills, presented earlier in particular, will allow current and future employees to successfully participate in the labour market of the future. The first group concerns competences that allow for effective cooperation with technology. The second group includes soft skills, such as social, emotional and behavioural

competences or entrepreneurship. It has been stressed that these are transferable skills, i.e. skills that are useful regardless of a specific profession or industry. In some professions, where automation increases productivity and workers' earnings, technological literacy can become a key skill for success. Therefore, learning to program should become a key part of education (in a gumtree.pl survey conducted by DELAB of the University of Warsaw in 2017, 82% of Poles believed that learning how to code should be compulsory at school). It can give basic skills of working with technology, but also teach other key skills – critical thinking, problem-solving strategies or communication of thoughts and ideas. The second element important for the labour market are soft skills, which is why the entire education system – from teaching children to higher education – should include their learning to a greater extent and in a methodical way (McKinsey & Company, 2018, pp. 29–34).

As the work environment of Industry 4.0 will be highly changeable, there is also a need for an education system that enables everyone to devote a significant and growing part of their working time to updating their skills and knowledge. For a successful labour market transformation towards a digital revolution, it will be important to create the conviction that lifelong learning is an integral part of our lives and careers. On the other hand, it will be necessary to provide opportunities for mid-career training and to promote it (at present, adult Poles learn less than the inhabitants of other European Union countries).

In the future, it may even be necessary to retrain completely for another profession, e.g., one with higher skills. It will require a change in the way of thinking and a conviction that what someone learns today in vocational school or at university will not be enough for the next 30–40 years on the labour market. Analyses of the potential for automation indicate that more activities can be automated in the case of tasks performed by workers with secondary and primary education. In addition, the current education model requires many years of study, whereas the labour market is already demanding a much shorter period of study that can be combined with work, whether in the form of training or short online courses called nanodegrees. They make it possible to obtain specific qualifications, sufficient to take up a job in a new field after only several months of study. For example, fast-track courses in programming in one or two selected languages can be an alternative to studying computer science. It may prove very difficult, if not impossible, for job seekers to give up their jobs in order to take up new studies and improve their qualifications in this way. Moreover, on the labour market, specific skills are much more important than diplomas and certificates. In many countries, the existing approach has led to an inflation of diplomas, which makes them required for jobs where a university degree is not necessary (McKinsey & Company, 2018, pp. 29–34).

School, including vocational school, is therefore only a part of lifelong education. This type of education cannot be stopped at these days. School is not the only place for learning. In the conditions of the fourth industrial revolution, education is no longer perceived in the context of “acquiring a diploma”, but begins to be thought of as an ongoing process of life-long learning, closely linked to the requirements of the labour market and the economy. In the ecosystem supporting an individual in lifelong learning, an important role is played not only by traditional institutions fulfilling an educational mission, but also by employers, whose interest lies in raising the competence of employees. The open learning model is also an important support. Materials available on the Internet and online learning platforms increase the possibilities for self-education at a low financial cost, allowing for a quick and customised way of acquiring knowledge and skills. There is also a growing commercial education market offering vocational microcourses with skills certification alternative to traditional learning based on academic degrees (so-called micro-qualifications or nano-education) (Włoch & Śledziewska, 2019, pp. 19-20).

In the age of digital transformation, we need competences that match the current and anticipated needs. The hierarchical model of education, assuming discipline and conformity on the part of the student, and the concept of a linear progression through the stages of the system in order to enter the labour market, where one works for life in one profession - must now be completely obsolete (Włoch & Śledziewska, 2019, pp. 19-20).

It is also important to remember that children who will begin school over the next few years will be retiring around 2070. No one has any idea what the world, including the world of work, will look like then. This begs the question, what will the current generation do if we continue to prepare them for life using old models of education? (Robinson & Aronica, 2012, p. 30).

It is worth reflecting on this.

1.1.3 Conclusion

The future of work requires competences of the digital age: 4.0. If schools, including vocational schools and institutions of extracurricular vocational education, as well as employers themselves do not develop them in the next generations of young people, they will not attract new talents, which may lead to wasting the opportunity created by the fourth industrial revolution and Industry 4.0. Therefore, the indicated entities should consider taking the actions indicated in this chapter.

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1.2

Polytechnic education as a prefiguration of dual training?

Lajos Somogyvári

Introduction

This chapter tries to build bridges from the key notion of socialist polytechnic education toward recent models of dual training, focusing on how the economic and technological aspect emphasised more and more in general education. By doing this, I will use the Soviet polytechnic education in the late 1950s, and the Hungarian example of implementing a school reform in 1961, which intended to be a new Sputnik of the education (these experiments failed some years later). As a main goal, I am trying to discover similar and different characteristics related to the old model and new ideas about combining school life and work in the same system. According to the theories of educational transfer, some crucial concepts travelled and transformed geographically and temporally, adapting to different circumstances and contexts, like old/new pedagogical ideas. Modern education faced several times with the following big challenge and question: What are the possible connections between school-knowledge and requirements of real work-life? A possible answer occurred from time to time again, getting labour market and school education closer. I do not think that these two models (socialist polytechnic education and dual training forms after regime changes, from 2000's) had an equal background or shared meanings, but the mechanism which can be observed, may give us some conclusions about taking education as a tool into consideration, when strengthening its economical and labour side.

Polytechnic education has very different meanings comparing the Western viewpoint (e.g. Atchoerana & Bolina, 1996; Auzinger, Ulicna, & Messerer, 2016) and the educational heritage of post-socialist countries. If we look at the second one, it is the part of the educational past – meanwhile dual trainings are very much alive –, polytechnic education based on the ideological model of socialist education. This kind of working education (or preparation and implementing into working) offered an experience of proletariat lifestyle to secondary high school students (mainly from the middle class) by participating one-day practice per week. On the other hand, it aimed to orientate them to blue-collar works (rather than producing more intellectuals, by increasing the volume of higher education) to restructure the human labour market. These motivations and discourses echoed decades later in unreflective ways in the background of contemporary dual training forms: the aim of this paper is to outline these deep-rooted links.

1.2.1 Methodology and theoretical background

Returning to the history of educational ideas may increase our consciousness in understanding the development of recent trends, the context of frequently re-

invented pedagogical thoughts (Muir, 1998). I follow a retrospective approach in my research; starting with the general description of present-day dual systems, then the specifics of polytechnic education go after, to see similarities and differences in thinking parallel education in the schools and at the workplaces. I am interested in the core logics, easily found in the theories of dual training and socialist polytechnics, as a special kind of comparative literature review. According to the historical discourse analysis (Landwehr, 2008) the socio-historical reality always constituted by several thematic points (propositions, which are repeatedly emphasized) and absences (covered aspects). After a literature review, I made a theoretical framework (see Table 1), in which my findings will be portrayed.

Table 1

Focal points of the research

Thematic focus	Short description (details)
Main principles	education in schools and at the workplaces: transition and/or integration
Goals	social, economic, ideological
Organization	schedule, teachers and trainers, collaboration
Values	socialization into the work ethic, hierarchy

These aspects commonly appeared in both discourses (dual vs. polytechnics), as a key pedagogical features characterised these concepts and appointed possible problems at the same time. Like a Begriffsgeschichte a la Koselleck (2006), a special educational language emerge, with the leading popular slogan of ‘Let’s bring the school closer to life and work!’, in very different contexts. The process of reasoning a needful cooperation between schools and companies may be explained by the concept of educational transfer too, which is about borrowing and lending educational ideas through different transformations and adaptations (Steiner-Khamsi, 2006, 2012); including a continuous circulation of discourses, practices and policies (Cowen, 2009; Phillips 2009).

1.2.2 Findings and discussion

Speaking about recent dual-training systems always used the examples of German-speaking countries as role models, but integrating vocational education and training experiences has several other examples from the developed world (Choy, Wärvik, & Lindberg, 2018). The literature draws our attention to the inherent logic of every important educational reform or innovation on a global scale after

1945: there are flagship countries, has to follow by the others. In the post-WW2 situation, the Soviet Union dominated the educational policies and of Central-Eastern Europe; after the regime changes in 1989–1990, the Western influences (UN, World Bank, European Community) played a similar hegemonic role. Turning back to the “duality” or work-based learning: this principle means a complex and mutual interaction nowadays, “how work experience is integrated within education” and “how educational experience is or can be integrated into work” (Grollmann, 2018, p. 65). It seems as a necessary requirement toward the educational system to give more practical knowledge (and not just in vocational education), which has been a longstanding demand against the “book-school”.

In 1958, Khrushchev published an article in Pravda, entitled ‘*Regarding the Strengthening of Ties Between School and Life and the Further Development of the Public Education System*’, announcing a new school reform. If we read it without the ideological ballast, it is a list of familiar problems and solutions; a product of a usual educational crisis, starting with a statement that education is essential, because:

“Particularly great is the role of education in our time when the successful development of the national economy would be impossible without the broadest utilization of the latest achievements of science and technology. (...) Nevertheless, we cannot be satisfied with the organization and the very system of higher and secondary education. (...) The major, fundamental defect in our secondary higher education is its isolation from life” (Khrushchev, 1958, p. 3).

Another confidential source from Hungary based on the same logic two years later, referring familiar arguments about school and life. The following details are from a proposal aimed to be a manual for educationalists and party members to argue and justify the Hungarian polytechnic reform:

“If someone asks, what the essence of the educational reform is, we can say: it is crucial to bring the school closer to life, connecting education with life and production. The core of the problems (...) that school was separated from life...” (Oktatásügyünk továbbfejlesztéséért, 1960, p. 4).

Polytechnic education – a “milder” form of dual system – was a key to bridge this gap in late 1950s, early 1960s, which did not mean a close integration of working and learning experiences in one, rather an orientation or transition toward labor market. This is another formative element beside a pedagogical synthesis of classrooms and workplaces in the dual trainings: the “work-oriented turn” exceed the traditional “distinction between ‘theory=school’ and ‘practice=company’” (Gessler, 2017, p. 715). We can understand the previous sentence as a reframing our thinking about what we do in the trainings from the viewpoints of parents, students, teachers, educationalists and so on – orientation before integration (or parallel with it), which is not an easy task. As a consequence of the intention

about getting school and work-life closer, the Marxist-Leninist ideas of all round development (physical, intellectual, aesthetic and labor), and permanent education widely spread in the educational thinking of the socialist countries (Malkova, 1979), this development defined as lifelong learning in Western countries (Jessup, 1970).

Why we have to do this? What is the need behind such duality? Several goals has been justifying this purpose, then and now. The first type of arguments are social: initially, inclusion and cohesion in welfare states (Atzmüller, 2015, p. 193), achieving low unemployment rate (Gessler, 2017, p. 701) belonged to these reasons in the literature of dual trainings. In the ideologically driven approach of polytechnic education, the public discourses suggested a presupposition/belief, that if every student from the secondary high schools met with physical work in the agriculture or industry, it would raise their proletariat consciousness and develop adequate communist attitudes (Shapovalenko, 1965; and this clearly directs us to the our next question related to the values). It has economic advantages too: in the global competition, nearing education to labour market needs may result getting high economic power (OECD, 2010). If we take a look at the realization of polytechnic education in 1960s Hungary, secondary high school students were free human resources for factories and state-farms; linking with a pseudo-reform in education (Laczik & Farkas, 2019, p. 1091). The 5-year economic plans pointed out the attendance of students in production work (for example in the Soviet Union, see: Simon, 1954, p. 3), so their contribution was expected by the party leaders for the higher GDP outcome.

Obviously, two opposite ideologies supported the vocationalization trend (about the cultural-historical origins from the 19th Germany, see: Deissinger, 2019). Involving youngsters into the work life in educational context has a definite role of socialization to the capitalist work ethic, hierarchy, including its cultural aspects (Atzmüller, 2015, p. 192); meanwhile the hardcore ideologists interpreted polytechnic education as a part of the socialist cultural revolution, breaking the educational monopoly of the bourgeoisie (Layonchkovsky, 1958). The target group and institutional form is very different. The socialist education tried to make general polytechnics for every secondary school students, with the ultimate purpose of transforming the mindset of the whole society. Meanwhile the dual systems are a bit narrower, focusing mainly on vocational education, and/or peripheral youth, early school leavers to reintegrate into work and school (Atzmüller, 2015, p. 190) - the ratio of attendance in dual trainings varied from country to country (Choy, Wärvik, & Lindberg, 2018).

The devil is always in the details: how the process organize in everyday circumstances. In Germany, the dual training is carried out usually three days per week in companies and two days a week in schools (Gessler, 2017, p. 695).

On the opposite, the common name of Hungarian polytechnic education was '5+1' system in the 1960s, because every high school student spent 5 days in the institution and 1 day in a factory or farm (that time, a workweek and school-week meant 6 days and not 5). The first school – work distribution is a real duality, a parallel training; the second one was like an introduction, made physical work more attractive for many students – in the reality, sometimes youngsters learnt more like avoiding work and hanging around at workplaces, than real work, as the personal memories confessed about the years of existing socialism. There are two sites of learning here, school and workplace; and acquiring the elements of the work culture in the fully employed socialism or in a competitive capitalist atmosphere are both useful knowledge. According to the duration and sequencing of periods, school-based and work-based dual systems operating and many alternatives between the two poles (Eiriksdóttir, 2018, p. 146). The leading countries of Austria, Germany and Switzerland combined vocational classes and on-the-job trainings at host companies in the form of apprenticeship (Rosenstein, Dif-Pradalier & Bonvin, 2015, p. 239).

There are different forms of how companies, educational institutions and other stakeholders/actors involved in the process and organized all over the world, including the many tasks about finance, responsibilities, tasks and so (Grollmann, 2018). There are cultural differences in this: in “Continental” Europe (Germany, France) the “conservative-corporatist” education functioning in a “coordinated capitalism”, where the State is very strong; on the contrary in the Anglophone world, the market model and liberal regimes is dominant (Deissinger, 2019, p. 293). Knowing the risks of every simplification and dichotomy, Hungary and Central-Eastern Europe belongs rather to the centralizing first type, in which legislation regulates many details: for example, how to make a contract between a school and company, select institutions to participate etc. For example, in a specific agreement from 1960, between a local secondary high school and an agricultural company, the following issues and many more were fixed: schedule, insurance, content and forms of training, control, evaluation, finance, labor safety, cultural and social life in the collective farm, etc. (Szerződés..., 1960).

It may has a positive aspect of a possible strong support from the governmental bodies in local actions, but on the other side, processes can slow down with growing bureaucracy. The Anglo-Saxon model gives a greater autonomy and freedom to choose for the educational actors, with all the pros and cons of such diversity (more to the two types: Meuret & Duru-Bellat, 2003). If we go beyond, demands are the same of every dual system in Europe and globally, independently from the previously drafted differences: developing infrastructure; and providing sufficient teachers, well-qualified trainers to it, with a good preparation (Evans,

2019). Through decades, we can read consequently alike debates about the crucial role of teachers, their deficiencies and responsibilities; and this great loading of new tasks may cause different forms of refusing, resistance or neglecting these interventions, but this is the job of anthropology and everyday history to discover (and the hidden voice of students are still missing).

1.2.3 Conclusion

Was polytechnic education really a prefiguration of dual training? The answer is a definite no. I can made only two statements about it: one is that similar challenges may led analogous resolutions and secondly, the languages of education, politics and economy affected to each other in every implementation, reform, and intervention into schooling. The socialist polytechnic education was not a success: it started as an innovation in early Soviet-Russia, changed into a traditional vocational education under Stalin, and became one of big and utopian experiment of Khrushchev, an elixir to every problem related with schooling (to the developing history of the idea until 1953, see: Lawton & Gordon, 2002, pp. 176-178). As the Soviet party leader proclaimed in 1958 in front the representatives of the Hungarian Science Academy: “the planned reform of the secondary and higher education will be the new Sputnik” (Somogyvári, 2018, p. 136). The rise and fall of the slogan was depended on political turns. High expectations and a kind of admiration followed the reception of dual trainings too, but differently from the socialist working education, the discourses contained some critical and reflective elements, showing the different intentions and conflicts of interest groups, which is natural in democratic societies. In my study, I concentrate only on the secondary level and excluding higher education from the investigation, which is another great field to explore.

Alliances between educational institutions and entrepreneurships will be more and more important in the future, as the scope of education is increasingly extending, based on international directions and proposals of the EU an UN (just two examples: The European Pact4Youth, 2017; UNESCO Recommendation..., 2020), aiming the next milestone of 2030. Another vision replays some of the previously mentioned goals and values:

“European VET systems by 2030 should aim to deliver excellent and inclusive education and training that offer opportunities for both economic and social cohesion, support competitiveness and growth and smart, inclusive and sustainable development, and foster democratic citizenship and European values – thus helping all individuals to develop their full potential in a lifelong learning continuum.” (Advisory Committee on Vocational Training, 2018, p. 6)

Vocationalization supports social and economic goals, associated with several values: this description fits to every modern educational system. From a historical viewpoint, we can call this trend as educationalization or pedagogization of outside schooling-problems: pushing social responsibilities to teachers and trainers, establishing and legitimizing interventions and reforms in education (Smeyers & Depaepe, 2008). Developments of past, present and future resembles to each other, intertwined economic, political and professional languages in such initiatives; calling scholarly communities to reflect their basic term, concepts and presuppositions, with an always-renewing interest. I intended this study to be just a short contribution to this work.

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2

**THE ROLE OF
VOCATIONAL AND SOFT
SKILLS DEVELOPMENT
FOR VOCATIONAL
EDUCATION**

2.1

The importance of ,Life skills' in undergraduate and lifelong teacher education in the 21st century

Markéta Švamberk Šauerová

Introduction

An important part of the professional and personal development of a modern teacher in the 21st century must be the building of their own social capital – so-called life skills, with an emphasis on the use of mindfulness techniques and the promotion of self-efficacy.

In the context of new social trends and an increase in challenging life events, taking into account the long-term pandemic situation and changes in the labor market, it is necessary to modify the objectives and contents of pre-graduate teacher training and subsequent lifelong learning courses in favor of promoting basic life skills. These must occupy a key position in the structure of the professional and personal competencies of today's teachers, because only then can such teachers lead the educational process at all levels of education adequately and effectively.

The chapter focuses on the integration of basic life skills into the complex system of competencies of teaching staff (with an overlap to other professions) and presents selected techniques that can be used in teachers' education.

At present, we are witnessing many social transformations that affect all areas of human activity without exception. In order to be able to respond to these changes, it is necessary to adequately adjust the education system in view of them, i.e. to focus attention on the education of teachers who work in this system.

Strategy 2030+ takes into account the social transformations and changes, whether we consider the Bauman-conceived liquid society (see Bauman, 2000) or the rapidly changing demands of the labor market, which need to be incorporated into the comprehensive preparation of teaching staff. This document contains a system of measures that aim to address the problems of the education system in the Czech Republic while taking into account the broader transformations that are taking place in contemporary society. The aim of Strategy 2030+ is to modernize education so that children and adults can cope in the dynamic and ever-changing world of the 21st century.

The newly planned education strategy also responds to the current trends that are reshaping many fields of human activity. These include in particular the fourth industrial revolution, which is usually seen through the prism of technological progress as a revolution in the area of digitalization and automation. However, it affects many other areas of human life. It changes the way we work with information – how we create, process and disseminate it. The ways in which we communicate, how we get to know each other and how we solve problems are changing. There is a growing need to understand the flow of information, to be able to analyze and reflect it critically. The technological and social aspects of this industrial revolution require the development of competences needed

for success in personal and professional life and in the labor market (Team of Authors, 2020).

The aim of modern education in the next period is to educate individuals who are equipped with the competences indispensable for life and are adequately motivated to apply their qualities on the labor market and are thus able to use their potential to the greatest possible extent in a dynamically changing world both for the benefit of their own development and for the benefit of the development of society as a whole. In order to achieve this objective, it is necessary to consider first of all that this way of education must be represented by teachers who possess these life skills.

As follows from the aforementioned, the first strategic objective in the modernization of education is to focus education on the acquisition of competences necessary for active and civic, professional and personal life – the so-called life skills. They are beginning to create an integral part of teachers' (and their pupils') professional and personal competence.

At the same time, it is important to consider that the original role and status of formal education keeps changing. The pace of technological, economic, social, cultural and environmental change is unprecedented. Moreover, we can expect that the pace of change will continue to increase. The skill sets required for both traditional and new occupations are changing. The pupils in schools nowadays are very different from the previous generations. The common socializing feature of this generation is, in particular, the use of digital technologies and the absolutely unlimited access to a vast amount of information, which they must first learn to critically assess and use it only then.

The forms of social contacts are changing, and they are often manifested by deficits in the fulfillment of social needs. These and many other trends present us with new challenges that are significantly different from those we have encountered so far (Team of Authors, 2020).

Since teachers are the key actors in the whole transformation process, we will focus on the development of their life skills and the specification of these skills in a complex system of pedagogical professional and personal competences.

2.1.1 The main conditions for the personal and professional development of teachers

As already mentioned, in recent years the demands on the teaching profession have been increasing significantly. The number of pupils and students with specific educational needs is increasing, the pressure on the use of digital

technologies in teaching is growing, and the parental population is becoming more differentiated (on one hand, the pedagogical expertise of many parents is increasing and their interest in cooperation with the school is growing, on the other hand, the number of parents with low social status, whose interest in cooperation with the school is at a low level, is increasing – the author’s experience from pedagogical-psychological counseling and her position as a school psychologist). Last but not least, the influence of the long-lasting Covid-19 pandemic, and the related use of distance/hybrid education, must be considered as well (e.g. Švamberk Šauerová, 2020; Vlach, 2020; Adamec, 2020, 2021; Bielešová, 2020; Nogová, 2020).

The often mentioned lack of concept or incompleteness of a number of legislative measures contribute to occupational stress – career code, inclusion, etc. (e.g. Somr, 2012); the inconsistency of teachers in their assessment of the process of inclusion – for example, Michalík (2013) or Hájková & Strnadová (2010) report that teachers complain mainly about the time demands, whereas Kaleja (2015) reports positive expectations of teachers during the implementation of inclusion; the general lack of funding in the education system – both for teachers’ salaries and for ensuring the newly introduced changes as well as for the day-to-day running of the school and teaching (Slepičková & Pančocha, 2013); and the contradictory social status of teachers (e.g. Helus, 2007).

The stress factors that affect the teacher’s personality from all sides lead not only to an increase in psychosomatic problems, but also to the increasing incidence of burnout syndrome and subsequent damage to the teacher’s health (Švamberk Šauerová, 2018).

Teachers’ health should be taken care of by the education system and society in general, but as it is true in other areas of human life, if we want to achieve a change, we must always start implementing the change ourselves, i.e. start from the individual (see, e.g., Atkinson & Chois, 2011, 2007; Whitmore, 2017; Švamberk Šauerová, 2018). In this context, the contribution in this monograph is also conceived. It focuses on the strengthening of selected life-skills (self-efficacy and mindfulness) in the professional and personal life of the educator, so that the acquisition of these skills could act as a preventive measure against the effects of stress factors and also contributed to the professional growth of the modern 21st century educator. However, a fundamental condition for this development must be the active approach of the teachers themselves and their own interest in self-experiential learning, which can be considered a primary source in the process of acquiring life skills.

2.1.2 Personal development

Personal development is a complex and all-encompassing process that affects all areas of our personality throughout our lives. This idea is closely related to the topic of lifelong learning, which is considered an integral part of the Czech Republic's Strategy on Education Policy. The National Program for the Development of Education in the Czech Republic (the so-called White Paper) even mentions that personal development is one of the key objectives of a lifelong learning.⁴

“The development of human individuality, the prerequisite of which is the care for the preservation of its physical and psychological health, involves the cultivation and promotion of the self-realization of each individual and the maximum use of their abilities. The cognitive, psychomotor and affective development of the human being is a fundamental goal that is necessary not only from the point of view of the individual but also from the point of view of society, because the overall creative potential of the inhabitants of any country is always the main source of its development and economic prosperity” (Team of authors of the Ministry of Education, 2001, p. 14).

Very generally speaking, we can say that the goal of personal development is progressive development. Specifically, the development of all layers of human personality, which are aimed at improving the life of an individual, creating a better future, full use of the human capital, achieving harmony, wisdom, maturity, self-awareness, finding the meaning of life and its full experience, maximum development of human abilities and also various virtues and moral values or achieving unity with oneself (Kolář & Lazarová, 2008).

Unlike these general goals of personal development there are also specific goals, the explicit form of which directly relates to the concerned individual and to their individual needs.

It seems practically impossible to create a general system of personal development goals that would encompass all the requirements and needs that people expect from the issue of human care. Nevertheless, it is possible to identify the basic areas in which we might consider personal development in relation to the individual and, subsequently, to the whole society. This issue is discussed in more detail in the following sections.

⁴ By the Government's approval of the Czech Republic's Strategy on Education Policy to 2020, the White Paper definitively ceased to be valid.

2.1.3 Professional development

The aim of vocational education is mainly professional growth and development, integration into society by passing on cultural and social heritage, sharing certain common values and shaping people to self-awareness and responsibility in the labor market and in the exercise of their profession. The essence of professional development is to create and maintain, as far as possible, an optimum match between subjective qualification (the individual's real competence) and objective qualification (the demands of a particular profession or position). This area also includes retraining, i.e. situation when a person has to change their original qualification in the course of their working life and to extend or deepen an already acquired qualification, which is very typical of the teaching profession.

In the context of professional education for teachers, it is necessary to stress the specific importance of lifelong learning for this professional group. As already mentioned, teachers are subject to extreme demands, both professional and personal.

2.1.4 Competences of teaching staff

Within psychology, it is a set of specific attributes and patterns of behavior. The acronym KSAO (Knowledge, Skills, Abilities, Other Characteristics) is often used in the context of defining this concept, which directs our attention to specific knowledge, abilities, skills and other characteristics that are relevant to certain roles and necessary for achieving specific goals (Muchinsky, 2006), (Levine & Sanchez, 2012).

Competences are dynamic in their nature and develop continuously. In a broader perspective, competences can be defined as the set of all the required qualities, abilities and skills, specific experience and knowledge, motivation and attitudes required for a specific activity (see more e.g. Vadíková, 2019). In this respect, competences should fulfill the following characteristics:

- traceable,
- measurable/assessable,
- improvable/open to change and development.

The so-called key competencies have been discussed since the 1970s. The term was first used in the work of Dieter Mertens (1974). His concept of competencies is based on a cognitive, action-oriented approach. He called them “key competencies” because they are important for coping flexibly with the demands of the working world.

The key competencies cross the boundaries of individual specializations, and based on Mertens' concept of competence (1974), they can be divided into the following groups:

- **Basic competences** - this includes basic mental operations as a prerequisite for cognitive coping with various situations and demands.
- **Horizontal competences** - acquisition of information, ability to understand it, process it and understand its specificity.
- **Extension elements** - basic knowledge in terms of fundamental cultural techniques important for a particular profession.
- **Contemporary factors** - filling knowledge gaps in relation to modern knowledge (Belz & Siegrist, 2000).

Currently, we are used to dividing competences into Soft skills and Hard skills.

- **Soft skills** - they are more generic, easily transferable between different disciplines because they are not tied to a specific work position or role in society. Their definition is based on the activity for which they are needed in order to master such activity. This type of competence is more difficult to measure and more effort is required to develop them. Soft competences include, for example: communication, cooperation, planning, information orientation and processing, flexibility, stress management or proactivity. They form a part of the more generally understood skills for life.
- **Hard skills** - they are also sometimes called professional competencies because they are linked to the performance of a particular profession, work position or social role. It is a set of requirements, specific knowledge, skills and experience that are needed to perform a particular activity successfully. They are usually easily measurable and well developing.

2.1.4.1 Competencies for Life

A specific place among the competences is occupied by the so-called Competences for Life. In 1999, the World Health Organization identified six key areas of life skills.⁵ They are as follows:

- Communication and interpersonal skills - i.e. the skills important for establishing social relationships with other people, for establishing cooperation, for transmitting and receiving information, whether in person or in writing. In the development we focus on:

5 More information is available at: <https://www.skillsyouneed.com/general/life-skills.html>.

- getting to know people - getting to know each other in a group/class; developing attention to differences and seeing advantages in differences; mistakes in getting to know people,
 - interpersonal relationships - nurturing good relationships; behaviors that promote good relationships, empathy and seeing the world through the eyes of the other, respect, support, help,
 - communication - practicing observation and empathic and active listening; applying verbal and non-verbal communication tools and strategies, communicating in different situations,
 - cooperation and competence - development of individual skills for cooperation (self-restraint in situations of disagreement),
 - ethical rules of social interaction and communication.
- Decision making and problem solving - here we find the skills needed to understand problems, find solutions, and be able to take action to solve problems. In this group it is also appropriate to consider, for example:
 - development of cognitive skills - sensory perception training,
 - developing of attention and concentration,
 - practicing memorization skills.
- Creative thinking and critical thinking - enables us to think about problems in different and unusual ways and to find new solutions or generate new ideas along with the ability to carefully assess information and understand its relevance, we can also consider promoting creativity in interpersonal relationships.
- Self-awareness and empathy are the key parts of emotional intelligence. With these skills we can understand ourselves and sympathize with other people. Its important part is:
 - promoting healthy reflection and self-awareness - skills for further self-development and self-concept - self as a source of information about myself; others as a source of information about me,
 - promoting self-confidence and belief in one's ability to achieve a goal (self-efficacy).
- Assertiveness and self-control - these skills are necessary in order to defend our own rights, or to resist wrongdoing (or to help defend the rights of others), and at the same time, through adequate self-control, we can resist aggression and provocation. In this respect we emphasize, for example:
 - supporting self-regulation and self-organizing - training of self-control, self-restraint - regulating one's own behavior and experience, will; organizing one's own time, setting personal goals and steps to their achievement,

- psycho-hygiene – skills for a positive frame of mind and a good relationship with oneself, such as social skills for preventing stress in interpersonal relationships; good time management; skills for coping with stressful situations (rational processing of the problem, ease and relaxation, effective communication, etc.); seeking help in difficult situations.
- Resilience – resilience as the ability to recover from setbacks, seeing these experiences as the opportunities for one’s own development and learning.
- Willingness to learn – this is particularly important in today’s ever-changing world, and it plays a crucial role in the development of life-important competences. Without this willingness and intrinsic motivation, it is not possible to consider adequate professional and personal development as an educator.

2.1.4.2 The position of the concepts “self-efficacy” and “mindfulness” in the structure of competences for life

The concept of self-efficacy

With the aforementioned rapidly changing social conditions and the increase in the impact of challenging life situations (caused in particular in recent months by the impact of the pandemic situation), there are higher demands placed on teachers, especially in the area of their current pedagogical approaches and used didactic methods. For many teachers, there is a loss of “confidence”, motivation and activity. In recent weeks, we can also see teachers leaving the education system, fearing that they will not be able to cope with further distance teaching, feeling that they do not have enough strength, knowledge and skills to cope with such a significant change in the concept of teaching and the loss of social contacts with their pupils⁶.

In addition to flexibility and increasing technological competences (the ability to work with modern technologies and with the significant, sometimes complex, changes in the concept of their teaching), we must not forget the key skill, namely the support and development of self-efficacy in the sense of “I can do it!”, “I will overcome the problem and will find a solution to the situation. I will manage it”. In general, self-efficacy can be thought of as a key life skill that should be given targeted attention not only in lifelong learning for selected occupational groups, but in general promotion of resilience and self-efficacy awareness in the whole population from an early age.

6 Author’s experience from the analysis of interviews and questionnaire surveys from Lifelong Learning courses for teaching staff focused on the prevention of burnout syndrome in the period 2020-2021.

Individual competences should not be understood in a narrow sense of the word, but as certain dispositions. Teacher's quality should be considered as a holistic concept (see Spilková, 2001), i.e. as an internally interconnected set of qualities, rather than as a set of separate and measurable skills that have been developed independently. The integration of competencies across these dimensions is a necessary starting point for a contemporary holistic view of teacher education, and the emphasis placed on developing an awareness of self-efficacy is closely related to this. Therefore, self-efficacy can be seen as an integrating competence, linking the professional and personal competences.

The methods of healthy reflection and self-reflection are essential in developing self-efficacy – in this respect, we can consider e.g. the use of SWOT analysis, self-reflective interview, self-reflective inventory, self-reflective experiences, self-reflective diary, the method of unfinished sentences (such as The poem of my life) and the personal development method based on coaching (the area of self-reflection support includes, for example, day planning, assessment of set goals – so-called smart goals, the wheel of equilibrium, positive life scenario, and successes of my life). A closer look at the use of appropriate reflective and self-reflective methods can be found in Švamberk Šauerová's publication *Techniques of Personal Development for Teachers* (2018) or in Bielešzova & Korenova's publication *Self-management and Managerial Ethics in the School Environment* (2021).

The concept of mindfulness

Mindfulness (mindfulness and presentability) is an equally important concept in the structure of life skills.

This term has been used more and more recently and is to be understood as mindfulness or full awareness of the current situation. We intentionally learn to pay attention to what is happening at the present moment, without assessment, judgment or expectation. It is a complex mental faculty or quality that can be further cultivated (more details J. Kabat-Zinn, 1990).

Most authors agree that mindfulness, or a mindful state of mind, is associated with a focus of attention on the present moment, with a limitation of conceptual thinking (non-conceptual observation of phenomena), with a thorough awareness of everything that comes into consciousness, and this is done with an attitude of openness, non-judgment, non-clinging, acceptance, interest showing, and non-striving. These qualities of mind develop factors that positively influence the perception of the current situation and contribute to psychological well-being.

Thus, “mindfulness” teaches us to live in the present, to be mindful of the situation “now and here”, which contributes to a greater mental capacity, inner well-being

and balance, and thus allows us to feel good (wellbeing, hügge, contentment – cf. Jandová, 2021).

Mindfulness associated with a non-judgmental stance (the so-called position of impartial observer) allows us to have a reasonable distance from emotionally charged content. Along with the creation of distance, we cease to identify with our feelings and especially with the contents of ideas and thoughts (“I am not my thoughts, feelings, emotions...”), which in the case of psychological problems are often the cause of their onset and duration. The distance itself brings relief and also allows us not to react automatically to our feelings and thoughts with habitual patterns of behavior that do not lead to a resolution of the situation. Mindfulness gives us the time and space to choose a conscious and considered response that is appropriate to the current situation.

Focusing mindfulness on the present moment allows one to avoid the habitual distorted patterns of rational processing and interpretations that are one of the most common causes of psychological difficulties (for example remorse, exaggerated inner criticism, doubtfulness). Paradoxically, a change occurs spontaneously, precisely because we have not become entrenched in habitual schemas.

Through the aspect of “not striving” (for a change), mindfulness helps to actualize the body self-healing mechanisms that may be blocked by inappropriate coping strategies. Ultimately, mindfulness and related mental qualities support emotional balance by ensuring that emotions and their individual manifestations are noticed, recognized, named, and accepted.

The main factors for developing “mindfulness” as an important competence for life may be as follows:

- daily rituals,
- small pleasures,
- present moment,
- a chance of choice,
- appreciating the little things,
- kindness – attitude of mind,
- self-care,
- joy – being aware of the experience of joy (recalling a memory),
- smile – even in the mirror at yourself.

2.1.5 Developing competences for life through lifelong learning and self-education

The development of life-skills should be considered as a lifelong learning process, and thus we should start developing these competences from the earliest age in the environment of formal education, with an emphasis on targeted development of teachers during their pre-graduate preparation for their profession (for example, self-experiential training, seminars with model situations, casuistic seminars, Balint groups as a part of their practice, encouraging the use of self-reflective methods as often as possible) and after their graduation, in other levels of their lifelong learning (non-formal, informal).

Informal learning takes place alongside mainstream education systems and does not usually lead to a formalized certificate. It can be provided in the workplace, through civil society organizations or through the organizations and services that have been set up to complement the formal systems. Its results may not usually translate directly into an improvement in the individual's position in the labor market and therefore they are therefore often underestimated. However, in the pandemic times, many educators have opted for training in this area, taking advantage of the wide range of providers of short-term (i.e. time-saving) seminars, mostly delivered online.⁷ Some of them were even able to obtain accreditation for such courses in a short time, and thus they could offer certificates to teachers. The prices of these courses are usually very reasonable, ranging between 150–300 CZK per seminar (usually 75 min).

Informal learning is a part of everyday life and, unlike formal and non-formal learning, it does not have to be intentional. Individuals often do not recognize the knowledge and skills they have acquired through it. When acquiring qualification, its results are not taken into account at all. Despite this, it represents a great potential for learning and could be an important resource for developing life skills.

Experience is a key condition for informal learning, but in general, we can say that experience forms the basis of the framework for developing life skills at all levels of lifelong learning and development (including formal and non-formal education).

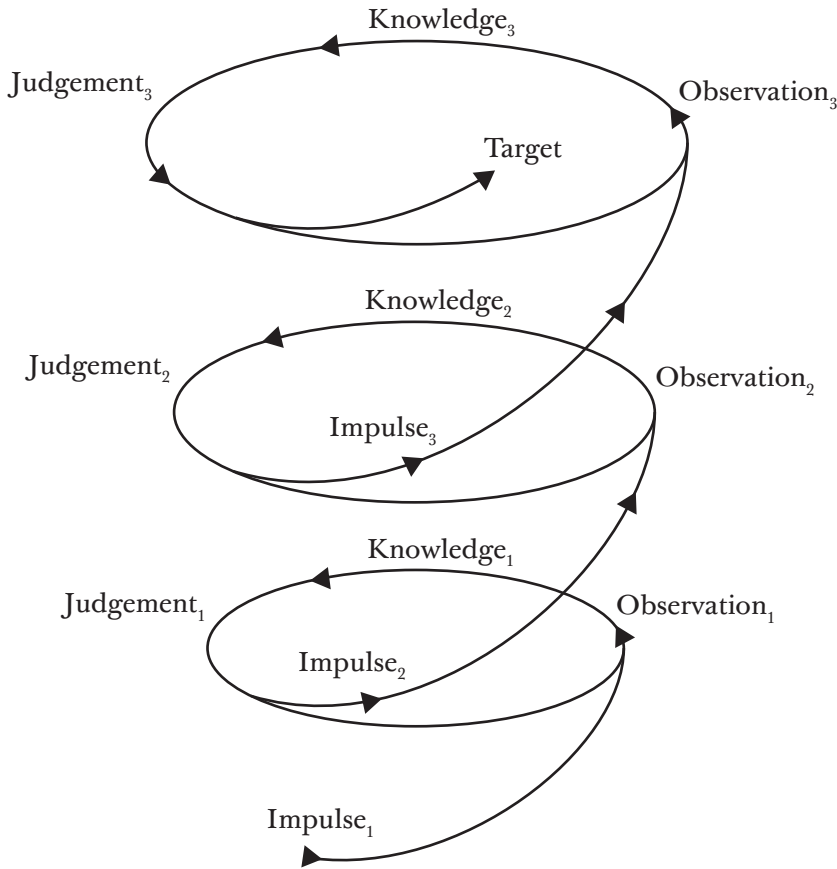
⁷ More information available at Educational portal „Vlavici“ <https://vlavici.cz> Digital market place „Učitelnice“ <https://www.ucitelnice.cz>

2.1.6 Self-experiential learning as a form of developing life skills in lifelong learning

The starting point, or inspiration if you like, for the use of self-experiential learning in the field of life skills development can be the model of J. Dewey, which is subsequently elaborated by D. Kolb and P. Jarvis. The Dewey model is particularly important from a personal development perspective because it emphasizes the acquisition of experience primarily through practical activity and experimentation. The experience is followed by providing or one's own inferring a theoretical explanation. Experience is thus at the heart of the whole learning process. In Dewey's model, he emphasizes the individual stages of the process: impulse-observation-knowledge-inference, where inference is consequently a new impulse (Dewey, 1913, 1950). This essentially corresponds to the structure of competencies for life, where we emphasize similar skills - perception - recognition - understanding - drawing a conclusion - use in practice. This process can also be illustrated graphically - see Figure 1.

Figure 1

Model of experiential learning according to Dewey (1950)

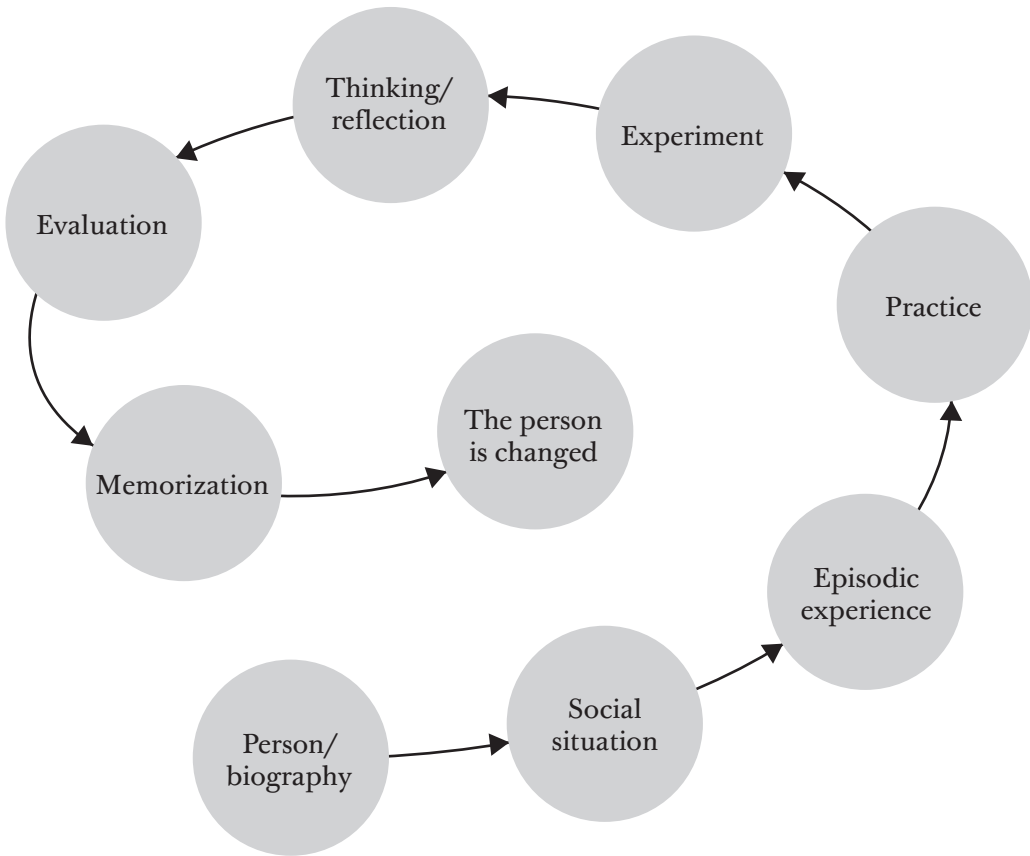


Source: Švamberk Šauerová, M.

Also according to Kolb (1984), knowledge is created through experiences. According to this theory, the learning cycle includes stages: a specific experience, reflective (deliberate) observation, and active experimentation (see Figure 2). We include the listed activities in the key competencies relevant to life (reflection development/self-reflection, observation, analysis of mistakes...), which again demonstrates the importance of self-experiential learning for the development of life skills.

Figure 2

Simplified model of the stages of reflective cognitive learning



Source: Švamberk Šauerová, M.

The importance of reflection is also emphasized by Jarvis's model. It depicts the reflective-cognitive learning phase, during which learning occurs through the aforementioned reflection on our actions and through our own experiences (for more details see Jarvis, 2004).

A crucial circumstance in using self-experiential learning to develop teachers' life skills is to create a sense of social security, without threats, so that the teacher can try out different ways of responding to situations without fear. In a socially safe situation, teachers can better reflect on the emotions and other processes that occur and that they can perceive during the learning process. There is also room for the perception of the other party. And these are very important moments that are lacking in the preparation of teachers for their profession.

2.1.7 Analysis of the experience of teaching staff with the forms of self-experiential learning

Although the self-experiential education can be perceived as one of the highly effective forms for developing competences for life, which significantly enrich the personal and professional development of teachers, it is appropriate to point out that self-experiential forms of teacher education are accepted by teachers with reserve and do not feel sufficient social security in these forms of education (Šauerová, 2011).

The evidence for this statement can be found in the results of a long-term survey aimed at the analysis of the interest in self-experiential learning among teaching staff during the period 2014–2020. These results can be further complemented by the author's experience of teaching in webinars, implemented over the last two years as a result of the Covid-19 pandemic.

2.1.7.1 Questionnaire survey on teachers' interest in and experience with self-experiential learning

A survey to analyze interest in self-experiential learning was conducted among almost 800 teaching staff at various types of schools (kindergarten, primary and secondary). The questionnaire surveys were carried out as a part of the Lifelong Educational Program courses (VŠTVS PALESTRA), as well as by lecturing in short-term seminars focused on the prevention of burnout syndrome and personal development under the auspices of Educa Vysočina organization or the Faculty of Education of Charles University. The author is active in these courses. The questionnaire was chosen as semi-closed.

The aim of the survey was as follows:

- analysis of the experience with this form of education in pre-graduate studies,
- analysis of the experience of this form of education in teacher training programs in the framework of a lifelong learning,
- analysis of the interest in this form of education.

A total of 786 teaching staff, 740 women and 46 men, took part in the survey. The number of respondents who had the experience with this form of education during their university studies is so low that there is no point in graphical representation of results. The vast majority of teachers who attended post-graduate education have not encountered this form of education in their pre-graduate training (86%). However, it is important to emphasize that the participants in

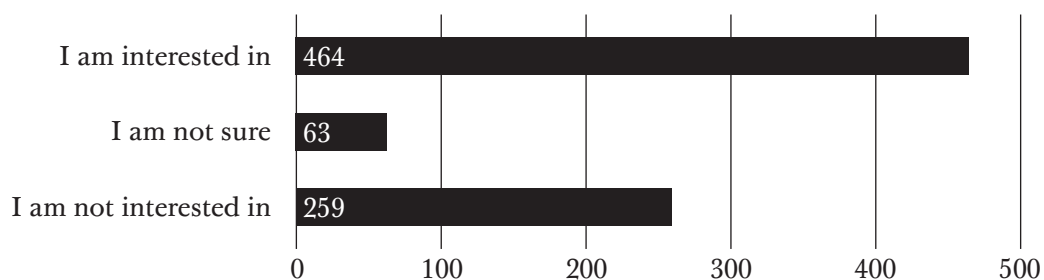
post-gradual education are not usually recent graduates, but teachers who have been in practice for a long time (often 20 years or more), which is related to the obtained results. If we look at the experience of the young respondents (in practice for less than 3 years - there were 32 of them in the sample), we find that these teachers belong to the group who have experience of self-experiential learning from their pre-graduate training (only 8% out of these 32 participants have no such experience). We can therefore expect that we will more and more often meet teachers who are already used to this form of education. However, when analyzing the qualitative part of the questionnaire, it was the respondents who had experienced self-experiential learning in their undergraduate training who reported that they had not felt comfortable during this form of education, as this form of education had been provided by a lecturer of a particular subject who subsequently assessed and tested them, which did not contribute to creating their social security in learning.

A much higher number of respondents have experienced self-experiential learning in lifelong learning courses - up to 60%, however their sense of social security is not higher. The respondents explain this by the fact that often more than one person from one workplace attends these courses at the same time, and as the relationships at the workplaces are not ideal, this form of learning is a high stress and risk for them.

The Graph 2 shows the distribution of responses regarding the interest in this type of self-education. It is clear that 33% are not interested in self-experiential training, often due to a feeling of lack of social security (the proportion of respondents has remained more or less unchanged over the years, however, a significant drop in interest occurred during the pandemic period), 8% are not sure, and 59% of respondents are interested in this type of self-education. Even though we can state that most of the teachers in the survey would be interested in self-experiential learning, it can be argued that the interest of the respondents is de facto very low, given their profession. Thus, the increase in self-efficacy appears to be a key resource for further personal development of teachers, and similarly, it can be considered essential to prepare training programs aimed at promoting a positive school atmosphere and promotion of a good corporate school culture.

Graph 2

Interest in self-experiential education

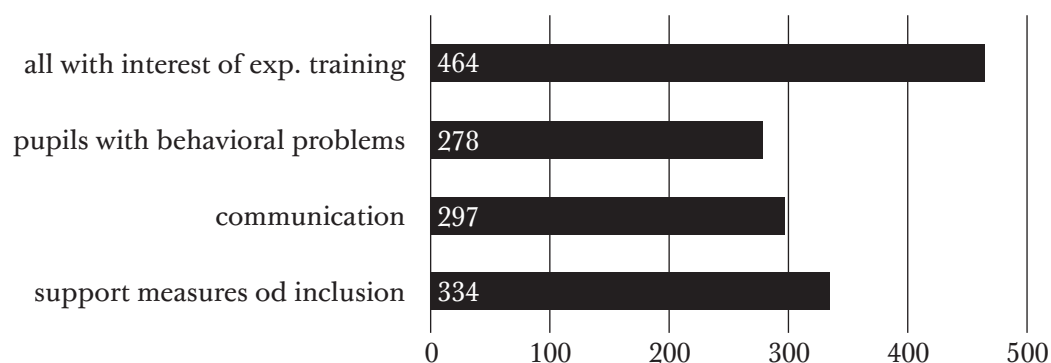


Source: Švamberk Šauerová, M.

Other results show in which area the teaching staff interested in self-experiential training considers the self-experiential training to be most important (they had a multiple choice option). They most often mention working with support measures in the general context of inclusion (72%), followed by the idea that this type of training is most important for learning appropriate ways of communication (64%), and when working with pupils with behavioral problems (60%). As can be seen, working with pupils requiring special approach is the most common challenge for teachers, and in this area they rightly understand that self-experiential learning can bring significant benefits. Teachers do not feel “safe” in working with pupils who require special approach, and the theoretical education in the course of their under-graduate training has not equipped them with sufficient knowledge or practical skills for many situations.

Graph 3

Opinion on the importance of self-experiential training



Source: Švamberk Šauerová, M.

In terms of developing life skills, teachers are particularly interested in problem-solving and communication skills, with a focus on assertiveness and self-control, which can be considered a positive finding. The lack of interest in developing creative thinking, self-confidence, empathy and resilience increase is alarming. Where teachers indicated that they were interested in the case study workshop, they also added that they preferred to participate passively and would prefer just watching other participants' progress in solving situations rather to their active participation (again, it is the influence of the social security demand). Unfortunately, passive involvement in case seminars logically conflicts with the purpose of organizing these case seminars. Thus, it is necessary to consider that we must primarily focus on building a sense of social security among teachers who would like to share problematic educational situations and their solving, and need to emphasize that uncertainty with the solution of a pedagogical situation is natural and that the manifestation of such an uncertainty is a sign of professionalism, rather than the other way around.

2.1.7.2 Summary of the obtained results

To summarize the obtained data, 100% of the respondents agree that self-experiential education is important for pedagogical staff. They the most often indicate that in the field of special education, it is most important to communicate and work with pupils with behavioral problems. 59% of the respondents are interested in this form of training, out of which 72% are interested in the issue of general supporting measures within the framework of inclusion, 64% in the development of communication, and 60% in the issue of working with pupils with behavioral problems (60%).

It shows that the teachers are not too keen on this way of education. It is possible that even the model situations during self-experiential training do not give them an adequate sense of security, they may feel threatened by other colleagues and other people who they do not know (however, they come, for example, from the same region or a small town). However, despite these arguments, it is necessary to consider whether such a teacher (with such concerns) is sufficiently personally equipped to perform this demanding profession.

It is in the context of these findings that the emphasis on the concepts of self-efficacy and mindfulness can be seen as essential and inspiring for the choice of direction for the further professional and personal development of teachers.

2.1.8 The importance of motivating teachers to develop life-skills in the process of lifelong learning

The motivation of adults for lifelong learning must therefore be approached as a particular issue of each individual and in motivating them, it is necessary to look for causal links between generally valid theories of motivation and the specific motivational structure of each individual.

In adult learning, we encounter several groups of motives that lead adults to further learning. In the first group, we can find the individuals in whose value system education occupies a significant place (both in terms of position and the concept of value as a goal, not as an instrumental category)⁸, and regardless of external pressure, e.g. legislative requirements, employer requirements, they regularly participate in further education.

The second group consists of representatives of those occupational groups who are subject to the legislatively established obligation to undertake further education or to attain a higher level of education in relation to the job they hold (e.g. teachers) and without attaining the prescribed qualification it would be impossible to perform the relevant occupation. This group has low motivation to engage in lifelong learning, as they feel that they cannot “effectively use” the results of this learning with respect to their direction, as it does not guarantee them qualification as such. For them, the improvement of their position on the labor market is a fictitious concept that can only manifest over a longer period of time.

Very briefly, in order to motivate teachers for personal development within the framework of lifelong learning, we can offer, among a large number of motivational theories, especially Alderfer’s ERG theory, which emphasizes in particular the importance of safety and social environment, Herzberger’s two-factor theory, which also emphasizes the importance of psycho-hygienic factors, and as the last one, Vroom’s expectancy theory for teachers’ motivation for personal development in lifelong learning, which operates with the attractiveness of the goal in the process of activation of the individual, where in terms of this theory applied in the process of motivation for education, the desired

⁸ The value of education appears in surveys rather as an instrumental value (see the survey conducted at the Palestra University, more details In: ŠAUEROVÁ, M. Active acceptance of values as part of creating a positive life scenario. In: NANIŠTOVÁ, E., FOTTA, P. Existentially significant values in personal, social and cultural context. Trnava, 2010. p. 211-221.), or it is assigned an average rating of importance in one’s life (see Reports of the Institute of Public Opinion. Prague: CSU - years 1990-1999).

outcome – the attractive goal – can be considered the subsequent work success, the actively adopted vision of improving the position on the labor market, or the establishment of new social ties.

2.1.9 Conclusion

In conclusion, we can say that the development of competences for life must be an integral part of the comprehensive professional and personal development of teachers since their pre-graduate training. In view of the importance of developing life skills, it is necessary to appropriately adapt the content of teacher education course offers, with an emphasis on self-experiential learning (in creating social security in the group) and to seek appropriate ways to motivate teachers to engage in these forms of training.

It is equally important to encourage the interest of teachers in individual forms of lifelong education, to accept the fact that we are the best source of our own development, and that there are nowadays readily available self-coaching tools to develop such key skills as self-efficacy and mindfulness.

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2.2

Personal and social competencies and their development during under-graduate teacher training

Zuzana Geršicová, Silvia Barnová, Slávka Krásna

Introduction

The theoretical background for the presented chapter focuses on the field of personal and social skill development in a broader context. The undertaken analysis of curricular documents of several countries paying increased attention to the issues of personal and social development and its key attributes on all levels of education is based on the ‘Council Recommendation on Key Competences for Lifelong Learning’, which has been adopted based on the recommendation by the European Commission. On the application level, the authors deal with the issues of vocational school teachers’ preparedness for dealing with the above demanding task and promoting their undergraduate training by using appropriate teaching methods and strategies in order to ensure personal and social skill development in them. In the chapter, also the results of a research study are presented, within the framework of which an experiment on the existence of a shift in teacher trainees’ opinions in personal and social fields following an intervention was carried out and the results of a pre-test and post-test were compared. The findings also point to the importance of promoting the above fields of undergraduate training by means of interactive activities.

2.2.1 Theoretical background

When taking a closer look on the issues of personal and social development, one can find out that – when compared with knowledge or professional competencies – developing certain life competencies is not paid sufficient attention to, although competencies and key competencies are the central theme in school education not only in relation to students, teachers, and the educational content, but they also have an impact on educational policies. A whole range of research studies have been focused on the issues of personal and social development, e.g. Wiek et al. (2011) outlined key competencies in the field of sustainability, as well as a reference framework for academic programme development; Cydis (2014) dealt with future teachers’ key competencies; Vačková (2013) focused on competence development in the study programme ‘Teaching’ based on students’ and graduates’ feedback; Lemešová et al. (2012) paid attention to the development of social-psychological competencies within undergraduate teacher training; Rieckmann (2014) described university education focused on the future and defined those competencies, which should be promoted in the context of university education; etc. In the text below, two examples of good practice that inspired the implementation of personal and social training in teacher training programmes in Slovakia are presented.

United Kingdom – England

Personal and social education is most frequently realized in the form of lectures, but taking advantage of interdisciplinary connections or links with other specific projects carried out by a particular school or a particular region is an option as well, and also, collaboration with counselling institutions is supported. Its content is neutral and currently, it is not a compulsory part of education (Valenta, 2013). The concept of personal and social development in secondary education is based on the *national* education strategy SEAL Social and Emotional Aspects of Learning, which is a complex programme on the national level. In its framework, personal and social education is targeted on developing social and emotional abilities, promoting efficient learning and positive behaviour in students, but also in employees (Valenta, 2017). Within the above project, personal and social training is realized in the form of lectures, they are frequently implemented in university courses and extracurricular activities in the field of providing support, and counselling in the broader community form its natural part, too. The overall strategy of education is focused on developing core competencies and skills necessary for further education and employment, as well as abilities in the fields of analysis, problem solving, argumentation, and effective communication (National Curriculum, 2004).

United Kingdom – Northern Ireland

In Northern Ireland, personal and social education is targeted on students between 6 and 16 years of age. In their school system, the understanding of cross-curricular connections is different from the above analysis as in Northern Ireland, transition units are included or realized within areas of study. There are eight transition units that are based on the key competencies defined in European documents. Even though the content of units is not strictly outlined - which gives schools freedom and autonomy - there are certain criteria to be followed. Their role is to ensure individuals' social and economic welfare (Curriculum Connections at Post - 16, 2020). In the process of curriculum development for all levels of education, a handbook is followed, which defines the fields, goals, and methods of work, and provides examples and sample activities (Maršák, Pástorová, & Topinková, 2013). A brief overview of the content is displayed in Figure 3.

personality development, the development of social skills and moral values. In state curricula, it is specified that the educational content of personal and social training are the students themselves, a group of students, or everyday situations, and it forms a part of cross-curricular fields within compulsory education. This fact makes the educational content of personal and social education a “curricular uniqueness” (Valenta, 2017). From this aspect, personal and social development and other cross-curricular fields overlap to a certain extent (Václavík, 2015). Considering the fact that in the Czech Republic, as well as in Slovakia, the content of education is divided into educational fields, the overlap between personal and social education and other fields is a matter of course. In secondary education, it is important to build on the skills developed during primary education and, subsequently, to work on students’ value orientation, and to lead them towards living full personal and civic lives. The ability of lifelong learning in combination with high-quality vocational education and training is of a great importance as well (Act no. 245/2008 Coll.; Act No. 561/2004). As for vocational education and training, state curricula both in Slovakia and the Czech Republic define graduate competencies, which are divided into key competencies, as well as vocational competencies. Key competencies include personal and social competencies, too. Their role is to ensure each individual’s healthy development and to help them achieve their life goals and priorities related to both, their private and professional lives. The ability to work in teams, to adapt to the changing life and work conditions, and to take over responsibility for accomplishing tasks form an integral part of it, too (RVP, 2009).

Key competencies represent a notion, which has been the topic of discussions among the professional public for several decades. Council Recommendation on Key Competences for Lifelong Learning was adopted by the European Commission in May 2018. In compliance with it, it is necessary to ensure high-quality education and care from an early age, to improve the existing educational systems from primary schools to vocational education and training, but also to modernize university education. The details of the above plan were discussed on 12th–13th November, 2019 in Brussels, at the conference *Supporting Key Competence Development: Learning approaches and environments in school education*. The focus was on education in Europe, where access to high-quality education, vocational training, and lifelong learning should be ensured for every individual. The most important outcome of the conference were eight key competencies that every individual needs for self-realization and development, job satisfaction, active citizenship, and social inclusion (Figure 4). Key competencies can be best developed in such educational systems, within which a broad scale of approaches, a variety of educational environments are used, and which provide support to teachers. Educational approaches applying project work, interdisciplinary teaching and involving external experts from practice show to be efficient in the direct educational practice.

Figure 4

The eight basic key competencies



Source: European Commission, 2019

In the below part of the chapter, the issues of personal and social competencies, the competence to learn how to teach during undergraduate teacher training, and the ability to develop these competencies in their students are dealt with. The main goal of education in the field of personal and social competencies is to develop students' learning skills, their ability to think about themselves, to be effective in time management and in working with information, to be constructive in teamwork, and in regulating own education and career. An important skill is manifested in the form of the ability to cope with uncertainty and stress, to maintain physical and mental health and emotional well-being, and to develop a complex personality able to live a healthy life targeted on the future. Alongside with that, individuals should not forget about their environment, they should be able to empathize with the position of other individuals, and to solve conflicts within a supportive, inclusive context.

Future teachers' desire to apply previous life experience and their desire to search opportunities for learning and developing in a range of life contexts (The Council of the European Union, 2018) should be one of the outputs of undergraduate teacher training. In accordance with the above, we would like to highlight the findings by Garaus et al. (2016), who dealt with autonomous motivation for learning, Gurpinar et al. (2010) who claim that – based on their learning styles – students' satisfaction with a variety of teaching methods and their academic achievement can be predicted, and Kyndt et al. (2015), who focused on students' motivation when transferring from secondary to university education. In undergraduate teacher training, it is necessary to supplement theoretical knowledge from profile subjects by vocational didactic training, which is a sum of knowledge from pedagogical, psychological and social sciences. Besides properly selected procedures mediating vocational knowledge, it is important to pay attention to dealing with behaviour issues in the classroom, developing communication skills, building mutual relationships with students, selecting appropriate methods of motivating students, or creating a positive classroom climate.

Unfortunately, university education does not excel in the variety of the applied methods and forms of teaching. It is usually limited to the basic forms of education, such as lectures, seminars, and exercises. As for the methods of work, passive methods prevail. As stated by Rohlíková and Vejvodová (2010) a lecture is a steady form of university education, and its basic function is to provide systematic theoretical lectures within a particular branch of science. It can be characterized by integrity, structure, clarity, and timeliness, and its difficulty is acceptable both from the aspects of the content and methodology. As for the methods of work, most frequently presentations and demonstrations – which should be supplemented by explanation – are used. In study plans, lectures are usually combined with seminars or exercises. Seminars form the basis for students' active participation in the educational process, their essence lies in a broad application of discussions, where students develop critical thinking, cooperation, interpretation and comparison of a range of problems and thoughts and they are helpful in the development of communication skills. In this context, the methods of chain discussion or panel discussion are frequently applied. Exercises, if compared with seminars, have their added value in developing practical skills which are directly linked with the application of theoretical knowledge. During them, the methods of group and pair work, or cooperative learning are used frequently. Within different forms of education at universities, various types of activating teaching methods and activities can be applied.

2.2.2 Goals and methods

Within the presented investigation, one of the goals was to examine the existence of changes in the researched elements on the level of teacher trainees' personal and social development following intervention - taking part in the university course Modelling and solving educational situations in vocational education and training within Master's teacher training programmes at DTI University. As teacher trainees at this university are future vocational subject teachers who will prepare students for a certain profession and for entering the real life, the main task within this university course is to provide them with an opportunity to experience how opinions or attitudes can be shaped by means of experiential methods and the impact they can have on personal and social development as well. The main goal was to apply the newly gained knowledge and experience in their teaching practice and to use the methods of personal and social development with their students as efficiently as possible. One of the partial goals was to provide teacher trainees with suggestions of methods and examples of good practice in the field of personal and social development, as well as key competency development in their students.

Considering the formulated research goal, an experimental research on a possible shift in teacher trainees' attitudes in the field of personal and social development based on a pre-test administered prior to the realization of an interactive course and a post-test following it was carried out. The experiment was focused on the application of activating methods of education within the university course Modelling and solving educational situations in vocational education and training. The data collected by means of an author-constructed research tool were compared based on selected research variables at DTI University in Dubnica nad Váhom on the sample of teacher trainees. From amongst the available relevant research methods, analytic-synthetic methods, methods of comparison, inductive-deductive procedures, classification, quantification, discussion and evaluation were opted for.

One of the partial goals was to find out about teacher trainees' opinions on solving pedagogical situations in school environment from the aspect of personal and social development and to compare them based on the results of a pre-test and a post-test using the variable of gender. For both the pre-test and the post-test the same author-constructed research tool verified in year 2017 was applied (Geršicová, 2018, 2019). The test contained 12 Likert scale items: 1 - I definitely agree; 2 - I rather agree; 3 - I do not know; 4 - I rather disagree; 5 - I definitely disagree. The research sample consisted of 267 respondents - teacher trainees - including 170 (64%) female students and 97 (36%) male students. Based on available statistical data on the percentage share of female and male

teachers in Slovak schools, we can consider our research sample well-balanced. The same applies to the percentage share of female and male teacher trainees at universities. The respondents participated in the experiment consisting of a pre-test, an intervention, and a post-test.

The presented research hypothesis was formulated based on one of the partial goals. We presumed the existence of statistically significant gender differences in the components of personal and social development following the respondents' participation in the interactive training programme within the university course Modelling and solving educational situations in vocational education and training in one item at least.

2.2.3 Results and discussion

The null hypothesis H0 says that there are not any significant differences between the individual items of the pre-test and the post-test in male and female respondents in the components of personal and social development. For verifying the hypothesis, the research sample was divided into two subsamples – male respondents (N=97) and female respondents (N=170).

As shown in Table 2 for verifying the statistical significance, the two-tailed paired t-test was applied.

Table 2

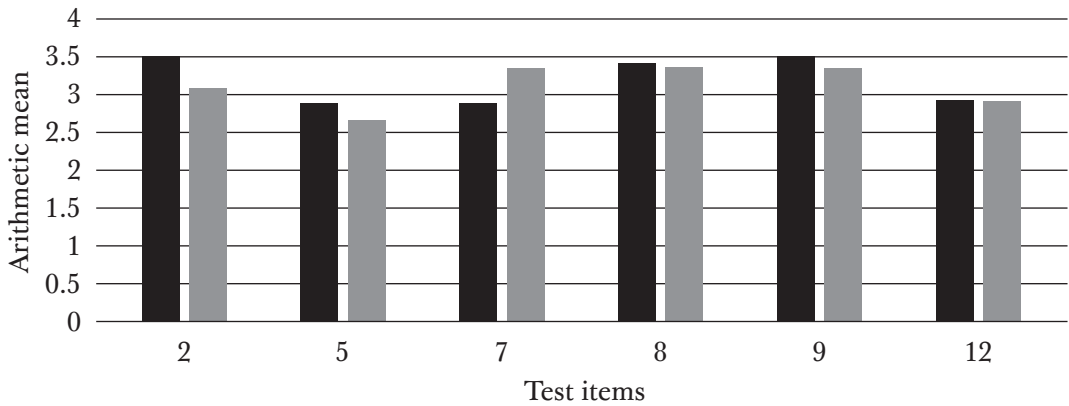
Differences in the items of the pre-test and the post-test in the field of personal development in female respondents

Item no.	Average pre-test	St. dev.	Average post-test	St. dev.	Two-tailed paired t-test	Sig. dif.
2	3.506	0.997	3.059	1.120	4.996***	p < 0.001
5	2.894	1.015	2.647	1.107	2.852***	p < 0.001
7	2.906	1.142	3.365	1.065	5.217***	p < 0.001
8	3.418	1.028	3.388	1.073	0.379	
9	3.506	0.985	3.376	0.915	1.750*	p < 0.10
12	2.953	1.242	2.941	1.247	0.125	

Source: own research

Graph 4

Differences in items in the pre-test and the post-test in the field of personal development in female respondents



Source: own research

In female respondents' (N=170) answers in item no. 7 "The first impression is very important for the inclusion of individuals and the assessment of their personalities" a statistically significant shift between the pre-test (M = 2.906, SD = 1.142) and the post-test (M = 3.365, SD = 1.065; t = 5.217, p < 0.001) was revealed. Statistically significant shifts - but in the opposite direction - were observed in three other items - no. 2 "A person's behaviour is mostly influenced by heredity and not much can be changed by education."; no. 5 "Conflicts and disputes are an expression of emotional weakness and a result of a lack of understanding from significant others."; and no. 9 "Conflicts are typical only for emotional and irrational people. Rational people can control themselves."

Table 3

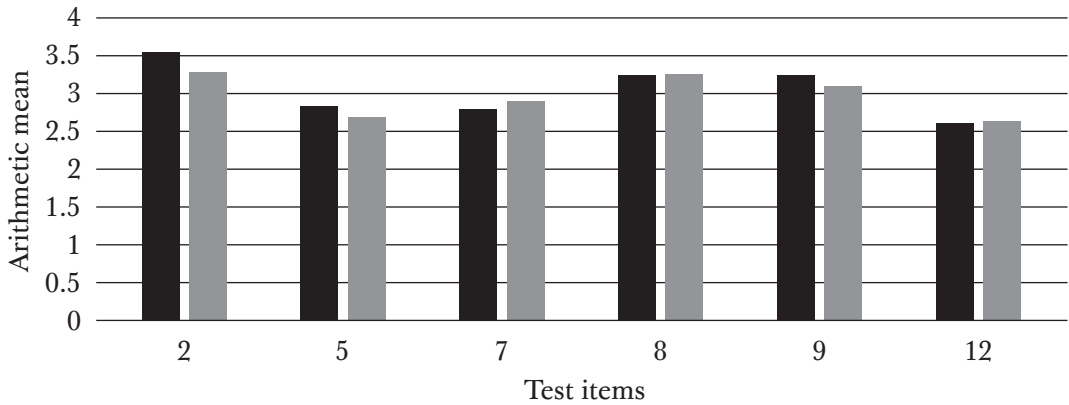
Differences in the items of the pre-test and the post-test in the field of personal development in male respondents

Item no.	Average pre-test	St. dev.	Average post-test	St. dev.	Two-tailed paired t-test	Sig. dif.
2	3.526	0.903	3.278	0.966	2.318*	p < 0.05
5	2.835	0.986	2.660	0.967	1.915*	p < 0.10
7	2.773	1.075	2.928	1.129	1.641	
8	3.206	1.070	3.227	1.113	0.188	
9	3.237	1.048	3.093	1.021	1.353	
12	2.577	1.249	2.608	1.177	0.310	

Source: own research

Graph 5

Differences in items in the pre-test and the post-test in the field of personal development in male respondents



Source: own research

A statistically significant shift in male students' (N=97) opinions was observed in two items – no. 2 “A person’s behaviour is mostly influenced by heredity and not much can be changed by education.”; and no. 5 “Conflicts and disputes are an expression of emotional weakness and a result of a lack of understanding from significant others.” In both cases, it was a shift in the opposite direction.

Table 4

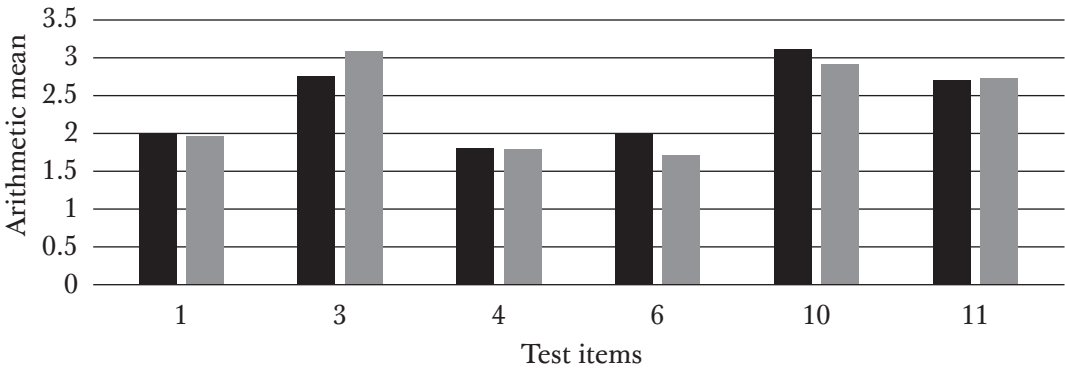
Differences in the items of the pre-test and the post-test in the field of social development in female respondents

Item no.	Average pre-test	St. dev.	Average post-test	St. dev.	Two-tailed paired t-test	Sig. dif.
1	1.976	0.789	1.959	0.891	0.276	
3	2.735	1.080	3.059	1.049	3.773***	p < 0.001
4	1.812	0.831	1.782	0.072	0.496	
6	2.000	0.812	1.700	0.707	4.398***	p < 0.001
10	3.100	1.172	2.918	1.139	1.965*	p < 0.05
11	2.706	1.117	2.724	1.075	3.720	

Source: own research

Graph 6

Differences in items in the pre-test and the post-test in the field of social development in female respondents



Source: own research

Female respondents' (N=170) answers in item no. 6 – “A change in the environment, the influence of peers, loss of background (family or peer group) can result in addictions” – in the pre-test showed how important – from the aspect of developing addictions – social background is (M = 2.000, SD = 0.812) and the results of the post-test showed a statistically significant shift in their opinions (M = 1.700, SD = 0.707; $t = 4.398$, $p < 0.001$). In item no. 10 “The majority of values, attitudes and opinions about life are formed in the family, schools have only a minor effect on them.” a statistically significant shift was observed as well (pre-test: M = 3.100, SD = 1.172; post-test: M = 2.918, SD = 1.139; $t = 1.965$, $p < 0.05$). The existence of a shift, but in the opposite direction, was observed in item no. 3 “Individuals’ behaviour is mostly influenced by upbringing, which can overcome heredity.”

Table 5

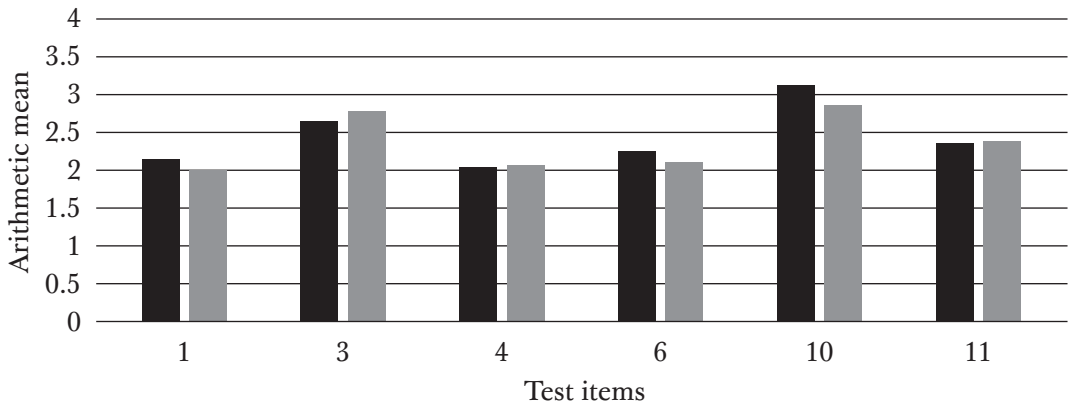
Differences in the items of the pre-test and the post-test in the field of social development in male respondents

Item no.	Average pre-test	St. dev.	Average post-test	St. dev.	Two-tailed paired t-test	Sig. dif.
1	2.144	0.790	2.010	0.714	1.601	
3	2.619	0.983	2.763	0.910	1.212	
4	2.041	1.079	2.052	0.958	0.093	
6	2.278	0.910	2.082	0.898	2.047*	$p < 0.05$
10	3.134	1.096	2.856	0.999	2.342*	$p < 0.05$
11	2.351	0.936	2.371	0.961	0.201	

Source: own research

Graph 7

Differences in items in the pre-test and the post-test in the field of social development in male respondents



Source: own research

Male respondents' (N=97) answers in item no. 6 – “A change in the environment, the influence of peers, loss of background (family or peer group) can result in addictions” – in the pre-test showed how important – from the aspect of developing addictions – social background is (M = 2.278, SD = 0.910) and the results of the post-test showed a statistically significant shift in their opinions (M = 2.082, SD = 0.898; $t = 2.047$, $p < 0.05$). In item no. 10 “The majority of values, attitudes and opinions about life are formed in the family, schools have only a minor effect on them.” (M = 3.134, SD = 1.096) a statistically significant shift was observed as well (M = 2.856, SD = 0.999; $t = 2.342$, $p < 0.05$).

The hypothesis for the group of female respondents in the field of personal development was confirmed. Statistically significant shifts were found in four items. The hypothesis for the group of male respondents was not confirmed.

Based on the obtained results in the field of personal development, it can be assumed that females' opinions can be more easily influenced based on emotions compared with male respondents, which can be a result of generational social learning. Another explanation of the above results is that female respondents tend to create a link between the realized activities and their own experience. We believe that the opinions in the case of both genders are relatively stable but can be shaped in a socially acceptable direction by means of experiential learning. These findings support the idea of using experiential methods within teacher training programmes in the university environment with the aim to increase the efficiency of solving educational situations in primary and secondary schools.

The hypothesis for the group of female respondents in the field of social development was confirmed. Statistically significant shifts were found in two items. The hypothesis for the group of male respondents was confirmed as well, statistically significant differences were found in two items.

From the aspect of social development, it is evident that both male and female respondents realized during experiential education what a strong impact changes in an individual's environment, influence of peers, of loss of family background have on the creation of value orientation, attitudes, and opinions, how they can contribute to developing addictions, but also that schools create environments which shape young persons' personalities. Therefore, it is important to pay sufficient attention to the development of future teachers' social competencies during undergraduate teacher training and to equip them with necessary skills to be able to apply them successfully when dealing with demanding pedagogical situations. It can be considered a potential for field didactics.

2.2.4 Conclusion

For the purposes of the pre-test and the post-test, self-evaluation questionnaires were used, which can be a limiting factor as this type of questionnaires provides the respondents with an opportunity to present their subjective attitudes towards the discussed issues without any objective factors. When evaluating own attitudes towards a particular situation or a presented problem, it comes to setting own criteria of evaluation. Considering the focus of the experimental intervention, it can be presumed that the extent of self-evaluation and the existence of feedback while carrying out activities within the university course Modelling and solving educational situations in vocational education and training form a solid basis for the evaluation of changes in opinions. The realized activities made the respondents reflect on their way of thinking about certain issues, facts, or in certain situations, which they could look at from a different perspective within the course and to confront their opinions with the opinions of other participants during ongoing discussions.

In general, it can be concluded that for shaping teacher trainees' personal characteristics and opinions, further changes in the strategies of certain activities carried out within the university course Modelling and solving educational situations in vocational education and training, as well as its structure are required. Taking into account the obtained results, the field of social development appears to be easier to influence and by increasing the number of teachers participating in university courses, a more significant shift in teacher trainees' attitudes could be achieved. A more complex approach could be ensured, e.g. within

the courses of Didactics and Field Didactics, where there is sufficient space for the implementation of interactive teaching methods and strategies. It must be noted that the process of personal and social skill development is not exclusively among the priorities of families or dedicated groups of teachers within certain subjects, but the result of a complex effort made by all teachers participating in the educational process.

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2.3

Transactional analysis as a tool for the development of teachers' competences in vocational education

David Kryštof, Petr Adamec

Introduction

The work of a teacher is very diverse and includes several activities. Teachers are confronted with pedagogical competencies or standards of the teacher's work, but they do not receive tools on how to develop the given competencies. One such tool is the psychological approach of transactional analysis applied in education. This text describes how individual concepts of transaction analysis can help develop individual competencies based on the standard of the teacher. The aim of the presented chapter is to describe the practical use of selected concepts based on the psychological approach of transactional analysis in the daily work of the teacher. In our work we use the term teacher and pedagogue. From our point of view, these are synonyms.

To fulfill the aim of the chapter, we will describe the professional standard of the teacher's work, the concepts of transaction analysis and then demonstrate how transaction analysis can support the teacher and his specific activities. The text pays attention to the professional standard of the teacher. In the section entitled Transactional analysis and its concepts in the field of education, we also describe selected concepts in addition to the basic philosophy of transactional analysis. These are models that help teachers understand different situations not only in teaching. These concepts are mainly theories of ego states, transactions and psychological games. The last part, entitled Practical use of transaction analysis concepts for the development of the teacher's competencies, includes a description of how knowledge of transaction analysis concepts would support the teacher's daily activities based on the teacher's professional standard.

2.3.1 Transactional analysis and its concepts in the field of education

Transactional Analysis (TA) is a young psychological approach founded by Eric Berne in the 1950s in the United States. The theory has developed since the beginning mainly in the field of psychotherapy. However, there are currently several areas of application, specifically in psychotherapy, education, organization and counseling. The role of the transaction analyst is different. In the psychotherapeutic field he works as a psychotherapist, in educational and organizational he works as a teacher, educator, facilitator or trainer, in the counseling field he works as a counselor (Stewart, & Joines, 1987, pp. 278–279).

Berne (2005a, p. 370) provides several definitions of TA. He mentions that this is a psychotherapeutic direction based on transaction analysis and chaining of transactions during the therapy session. He also mentions that it is a theory

of personality, which is based on the study of the differences of individual ego states. Another definition is that it is a theory of social behavior that examines individual transactions in detail. Berne (1970) mentions the main goal of TA, which is to achieve autonomy.

The following section describes the philosophical assumptions of TA and selected theoretical concepts based on TA. The basic philosophy is important because it is a mutually respectful approach. Furthermore, theoretical concepts of basic needs and strokes, contracting, life positions, functional model of ego states and transactions and finally psychological games are described. We chose theoretical concepts based on our own practice and from the TAPATE model, which we are working on. This is not an exhaustive overview of all theoretical concepts. The nature and scope of this work do not allow it.

Philosophical assumptions of transactional analysis

Berne (2005, pp. 209–214) described TA's philosophical assumptions about people, life, and objects of change. These assumptions are: people are OK, everyone has the capacity to think – to understand their own problems (Steiner, 1974) – and then that people decide on their own path and can change their decisions. Stewart and Joines (1987, pp. 6–8) complement the other two basic principles of TA practice, namely the contract method, where the responsibility for change lies with all parties involved (in our case both teacher-teacher and teacher-student responsibility, and then the teacher – parent), and open communication to share the whole process (in our case, the educational process).

A prerequisite for working with TA is the ability of direct observation and intuition, which serves to understand the relationship and specific types of communication (in the terminology of TA double transactions) (Widdowson, 2010, pp. 7–8).

The philosophical assumption that everyone is OK in a school environment means that everyone can be respected, even if they do something we don't like. Mutual respect is for both knowledge and man as a human being.

Basic needs and strokes

One of the main concepts of TA is basic needs, referred to in TA terminology as hunger. Theory can also be understood as a motivational theory. These hungers are 1) hunger for stimuli, 2) hunger for recognition, and finally 3) hunger for structure (Berne, 1997, p. 29). Hunger for stimuli includes the need to gain new information, new experiences. It is necessary to satisfy different senses. In case

of deficiency, there is a risk of stimulus deprivation. Hunger for recognition is characterized by a desire to gain attention. Alternatively, confirm that I exist at all. We will comment more on hunger after recognition later in the text. Hunger for structure is the effort to understand things in context. In the context of pedagogical activities, we can observe this hunger among students, for example, in that they want to know at the beginning of the lesson how the lesson will take place, whether they will be tested, or what will actually be done.

Hunger for recognition is associated with so-called strokes in TA. Strokes were first defined as units of ritual transaction (Berne, 2005a, p. 249), then as an act of showing recognition or attention (Berne, 1970, p. 17). Stewart and Joines (1987, p. 73) divide strokes into verbal and nonverbal, positive and negative, and conditional and unconditional. Verbal represents verbal communication, non-verbal through body language (both gestures and haptic expressions). Positive strokes provide joy or pleasure, they are associated with a positive feeling for the recipient, negative ones are associated with unpleasant feelings. Conditional strokes are dependent on some activity, unconditional ones are then unintentional.

Knowledge of the concept of basic needs means that the teacher is able to set up and effectively communicate a clear structure of the teaching unit, can prepare a teaching unit full of stimuli and is able to provide recognition through strokes. Knowledge of strokes theory means that the teacher is able to consciously provide not only students with both conditional and unconditional strokes, work with verbal and nonverbal strokes and at the same time can provide positive or negative strokes if necessary.

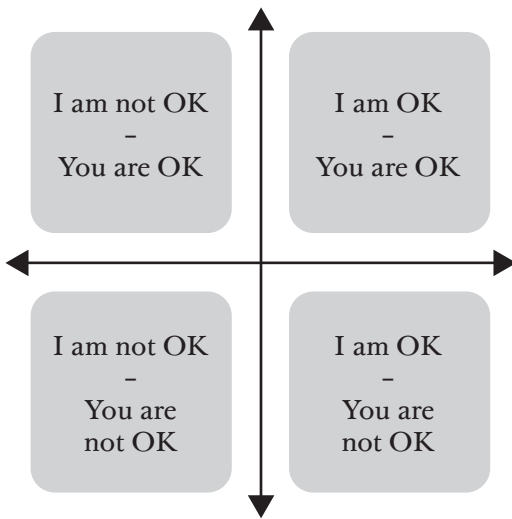
Theory of life positions

The theory of life positions is closely related to the basic philosophy of TA. The essence of the approach is respect, in TA referred to as OKness. We can perceive OK itself as a belief in ourselves and at the same time a belief in another person (Stewart, Joines, 1987, p. 119). We can perceive it in terms of self-confidence and respect. It should be noted that it is not what the other person is like, but how we perceive them.

The concept of life positions was developed by Ernst (1971) and subsequently by Harris (1997). Ernst (1971) created categories of social tasks based on self-perception and the perception of the other person, which are 1) to continue, 2) to get rid of, 3) to run away and 4) to get nowhere. As shown in Figure 5 the first category joins the life position I am OK - You are OK, the second to I am OK - You are not OK, the third as I am not OK - You are OK and the fourth as I am not OK - You are not OK.

Figure 5

Concept of life positions



Source: own work

The individual quadrants are then characterized by the way of communication and the creation of interpersonal relationships. Life positions are also observable and can be used to describe the behavior of the teacher. The position I am OK – You are OK is a so-called healthy position, where the teacher looks healthy and confident and at the same time treats students with respect. The teacher who is in the position I am OK – You are not OK, creates a feeling of inferiority in the students, gives them rather negative strokes and generally does not support them in the learning process. The teacher who is in the position I am not OK – You are OK in a way that has low self-esteem, has a quiet voice, does not show too much and avoids confrontation with students. The teacher in the position I am not OK – You are not OK works in a burnt way when they do not care.

Functional model of egostates and transactions

TA includes two types of ego state models. One is the structural model and the second is the functional model (also called as a behavioral model). The structural model of ego states is used in psychotherapy, the functional model also in other areas of TA application (Stewart & Joines, 1976). For the needs of this work, We will focus on the functional model of ego states, which is then associated with the theory of transactions.

Berne (2012, p. 26) states that the term egostates is only intended to denote states of mind and associated patterns of behavior as they occur naturally,

and to avoid the use of contrived terms such as “instinct”, “culture” in the first place, “Superego”, “animus”, “eidetic”, etc. This distinguishes Berne to other psychological approaches, especially to psychoanalysis, which was significantly influenced.

Berne explains ego states with three pragmatic absolute truths and three general hypotheses (Berne, 2012, p. 31): 1) Each adult was once child. (Childhood relics survive into later life as complete ego states - archeopsychic relics.), 2) Every human being with sufficiently functional brain tissue is potentially capable of an objective assessment of reality. (Objective judgment of reality is a function of continuous ego states, not an isolated “mental ability” - neopsychic functioning.) And 3) each individual who reached adulthood had either functioning parents or someone who represented them. (The executive power for an individual can be taken over by the complete ego state of another individual, as observed - the extero-psychic function.)

Ego states can be diagnosed in a behavioral, social, phenomenological and historical manner. Behavioral diagnostics has been developed into various forms of body language and verbal formulations (Berne, 2005a, pp. 133-136). Thus a functional model of ego states was developed by Dusay (1972).

The functional model of ego states includes three basic ego states - Parent, Adult and Child, but at the same time distinguishes into other ego states: Critical Parent, Nurturing Parent, Adult, Free Child and Adapted Child (Stewart, Joines, 1987, pp. 21-29). The Critical Parent has a positive form in that it creates a clear structure and gives order, and a negative one in unconstructive criticism. The Nurturing Parent offers and provides support in their positive form. In a negative form, The Nurturing Parent then interferes with the powers of the other person. The Adult focuses on the essence of the matter, solves the situation in an intellectual way. The Adapted Child also has positive and negative manifestations. A positive sign is that they can adapt and work effectively in desired situations. The downside then is that The Adapted Child adapts too much and is often passive because of being afraid to make a mistake. The positive form of the Free Child is represented by creativity and spontaneity, the negative then by ruthlessness towards others (Temple, 1999, 2004, Mountain & Davidson, 2011).

The theory of transactions is closely connected with the functional model of ego states. Transactions consist of one stimulus and one reaction and form a unit of social interaction. They are called transactions because each of the participants derives something from it, and therefore they also participate in it (Berne, 1997, p. 28). Just as ego states can serve to understand an individual, transactions can serve to understand behavior between two or more people (Steiner, 1974, pp. 33-34).

There are four types of transactions: complementary, crossed, double and triangular (Berne, 1997, pp. 22-29). A complementary transaction is a situation where one person uses a specific ego state and addresses a specific ego state with another person, the other person responds from the ego state to which it was communicated, and communicates his message to the ego state from which it was originally communicated (Berne, 2005, pp. 223-225). It can be indicated that the factor invites the respondent to communicate with clearly defined egostates and he accepts it (Napper & Newton, 2010, p. 80), so it takes place within the limits of healthy human relationships (Berne, 1970, p. 32). A problematic or unsuccessful transaction is a so-called crossed (Berne, 1970, p. 34). This is a situation where the answer comes from a different than expected ego state (Schlegel, 2007, p. 220). The double and triangular transaction was first conceived as one type of transaction with a psychological and social level (Berne, 1970, p. 37). Only then was it divided into two types with the difference of used ego states. A triangular transaction is one in which only one of the factor states is used, while in a double transaction two egostates are used (Berne, 1997, p. 25).

From our point of view, practical knowledge of this theory represents that the teacher is able to adequately use all three egostates, including further subdivisions, and can communicate effectively (use different types of transactions). For ego states, it cannot be said that some are good and some are bad, it always depends on the circumstances in which it is used. For example, when setting the rules, the Adult and positive form of the Critical Parent is useful. The ego of the Nurturing Parent is useful in supporting the pupil (especially its positive form). In promoting collaboration and creativity, the teacher should be able to reach the Child's ego states with the pupils to support their motivation.

Psychological games

The last mentioned theory is the theory of psychological games. These can be defined as a set of consecutive double transactions with hidden motivations leading to a clearly defined goal (Berne, 2005a, p. 153). The benefits of playing games for players can be the confirmation of their own self (their existence), inner satisfaction or the effort to avoid an unpleasant situation (Berne, 1978, pp. 79-80). The game is dishonest in its origin because it contains competitive and conflicting elements, and its result is exciting and often dramatic (Berne, 1970, p. 52).

Over time, Berne has argued that each game has its own six elements that follow each other. These are the hoax, the trick, the response of the agent, the triggering of the switch, the crossing of transactions and the gaining of profits from the game (Berne, 1997, p. 32).

$C + G = R \rightarrow S \rightarrow C \rightarrow P$

Con + Trick = Response \rightarrow Switch \rightarrow Crossup \rightarrow Payoff

For a clearer understanding, we will give an example of a game from the background of pupils' education, which Berne calls "Cheating him". The student asks the teacher about a very specific area in which it is assumed that the teacher will not know. The teacher answers. If the answer is correct, the game does not continue. If the answer is "I do not know" or the teacher comes up with an answer, then the student switches and responds with the sentence: "And you really think you should teach if you don't know ?!" with a slightly ironic tone of voice. The hoax in this case is the student's question itself (impure interest in the real essence), the trick is the teacher's sentimentality that the student is interested. After the subsequent answer to the question, the role is switched and the transaction is crossed (criticism of the teacher). The profits for the individual participants follow - for the student it is a profit in the form of a good feeling, for the teacher a sweat on the forehead and an unpleasant feeling.

Karpman (1968) identified three roles in the games, which are victim, persecutor and rescuer. This is a simplification of Formula G. According to him, one of the roles will play the game, and then there will be a switch. The concepts of psychological games can be applied to interpersonal, inter-team games, but also to indoor games. Karpman (2007) states that in each game we can identify 10% of OK answers (i.e. from the position I am OK - You are OK), 10% truth and 10% total lies, at the same time he mentioned that 10% of the population responds in the same way.

Psychological games are challenging communication situations. We can also include conflict situations in this area. At the TA seminars, we became acquainted with the interesting idea that in situations where the contract is not clear, there is room for psychological games. When we think about it, it makes sense to us. From the point of view of the teacher's work, it is possible to observe, for example, a situation where the condition of the teacher's reaction when copying during a written test is not clearly defined. If the teacher sets clear rules (organizational and psychological level of the contract) before taking the test, then the pupils know in advance what will follow. At the same time, the teacher knows this. This precedes the game, which we could call Catching him, or I'll give them a lesson.

2.3.2 Teachers' competencies

What are the teachers' competencies? What should they do and what should they not do? If we looked at these issues from the perspective of teachers, students and parents, we would probably come to very interesting findings. The aim of

this part is to clarify the activities and competencies of the teacher. We aim to subsequently select the key competencies of a teacher, which we will then link with the psychological approach of transactional analysis.

To define the competencies of the teacher, it is useful to clarify what is the subject of pedagogy. The subject is educational reality, its processes and constructs (Průcha, 1997, p. 27). In the context of this work, we consider it very important to emphasize the word education and specifically education. Šafránková (2019, p. 36) states that education is a purposeful and deliberate process that enables change and development of the individual in accordance with his needs, individual dispositions and social relations. From our point of view, it is about the formation of a person's personality in order to support the process of socialization.

As for the competences of the teacher, the professional pedagogical literature offers the specifics of the areas where the process of education is described as the content of the teacher's activities (cf. Kasíková, 2019; Šafránková, 2019) and also the focus on beginning teachers (cf. Švec, 1999; Vašutová, 2004). For example, the competence model of the school principal (Trojan, 2019) can be found in professional sources, but this does not apply to this text. The following text describes the professional standard of the teacher.

The professional standard of a teacher and the standard of competencies of teacher students is a long-term topic not only at the pedagogical faculties of Czech universities and colleges. For example, Vašutová (2001), Kratochvílová and Svojanovský (2020) pay attention to it. In 2009, the Ministry of Education, Youth and Sports made an effort to create a Teacher Standard. However, instead of the standard, only information about its plan is available on the website of the Ministry. In the following text we will describe the view of the professional standard according to Vašutová and also the currently prepared document of Masaryk University, which deals with the quality standard of professional competencies of a teaching student.

Vašutová (2001) mentions various competence groups in the draft professional standard for teachers. It lists a total of seven. They are:

1. subject competence,
2. didactic and psychodidactic competence,
3. general pedagogical competence,
4. diagnostic and intervention competence,
5. social, psychosocial and communicative competences; this includes the teacher mastering the means of creating a favorable working (learning) climate based on knowledge of pupils' social relationships; masters the means

of socialization of students and can use them in practice; is able to orientate in difficult situations in school and out of school and is able to mediate their solution; knows the possibilities and limits of the influence of the out-of-school environment, peers and the media on pupils, is able to analyze the causes of negative attitudes and behavior of pupils and use remedies; masters the means of pedagogical communication in the classroom (school); is able to apply effective ways of communication and cooperation with parents and social partners of the school, is familiar with the issues of family education,

6. managerial and normative competence; it introduces the teacher's organizational skills; controlling student leadership and creating conditions for effective classroom collaboration,
7. competences of professional and personal cultivators, which represent that the pedagogue is able to act as a representative of the profession on the basis of the acquired principles of professional ethics of the teacher, can argue for the defense of his pedagogical procedures; has personal preconditions for cooperation with colleagues in the church; is able to self-reflect on the basis of self-evaluation and various subjects of evaluation; other prerequisites: mental and physical fitness, good current health status, moral integrity.

A somewhat more up-to-date elaboration of a teacher's standard translated into separate publications is the Standard for the Quality of Professional Competences of a Teaching Student (Kratochvílová & Svojanovský, 2020) issued by Masaryk University. This standard represents a total of five thematically focused criteria. These are teaching planning, learning conditions, learning support, feedback and teaching reflection. Within each criterion, the teacher's perspective is described, i.e. what he should do within the given focus. There are also four levels of competencies, i.e. a breakdown of what is meant by "missing competencies", "emerging competencies", "evolving competencies" and "advanced competencies". Below we present the individual perspectives of the teacher in individual areas:

1. Teaching planning

- I consult with the accompanying teacher according to the agreement preparation for teaching (follow-up to the SEP, thematic plan, previous work of the teacher and students).
- When planning teaching, I take into account the possibilities of specific students - I individualize and differentiate the teaching plan based on information about the student and his special educational needs (SEN), provided by the accompanying teacher, obtained by own diagnostic activities and documentation, i.e. from the individual educational plan pedagogical support plan (PLPP).

- I formulate learning objectives (cognitive and / or attitude and / or psychomotor) and think about their connection with the curriculum, teaching methods, organizational forms, i.e. with the overall concept of teaching. I plan ways to verify the fulfillment of goals.
- I perform a didactic analysis of the curriculum (key concepts, learning tasks) taking into account the set goal; I plan adequate teaching methods, organizational forms.
- I am working on a timetable for my teaching progress.

2. Learning conditions

- I support safety in the classroom (positive atmosphere).
- I solve disciplinary problems (I work with established rules as needed or I negotiate them together with students; I pay attention to their observance, I appreciate positive manifestations of students' behavior).
- I maintain "live contact" with the pupils (through voice, non-verbal communication, addressing the pupils by their first name ...).
- I respond with respect to the needs (social, physiological) of students in the classroom.
- I create a space for "relief" (I work with changes in the atmosphere, I respond to signs of fatigue, fluctuations in attention, I show a sense of humor, I diversify the interpretation with interesting facts and my own experience ...).
- I create an opportunity for all students to experience success.
- I use time effectively in teaching (in relation to my plan, classroom situation and curriculum understanding).

3. Learning support

- I communicate (discover) with students the meaning of the curriculum and its meaningfulness.
- I set and mediate to students (if appropriate with respect to the method) adequate learning objectives (common, individual). I continuously verify the fulfillment of learning objectives, I evaluate their achievement.
- I provide educational content and instruction in comprehensibility with regard to the individual educational needs and age of students.
- I mediate the subject matter of my subject factually correctly.
- I explain the curriculum using the previous knowledge and experience of students.
- I use teaching methods and organizational forms that support students' learning and lead to the goal.

- I support cooperation and mutual learning of students.
- I work meaningfully with the mistake of students as an opportunity for development.
- I use information technology (ICT) meaningfully to support students' learning.

4. Feedback and evaluation of pupils' results

- In particular, I provide students with ongoing feedback using descriptive language and criteria with regard to their individual needs.
- I lead pupils to reflect on their own results and learning progress (self-assessment) and to provide feedback to others (classmates and teachers).
- I use a variety of assessment forms and indicators of pupils' learning outcomes and progress.

5. Teaching reflection

- I reflect on the course of teaching (or preparation for teaching).
- I set adequate goals for my professional development, I put into practice the steps to achieve them and I evaluate them (within the current or next semester).

For the needs of this chapter, we decided to choose the standard of a teacher mentioned by Kratochvílová and Svojanovský (2020), which in the section Practical use of transaction analysis concepts for the development of teacher competencies we will process in the context of the transaction analysis approach.

2.3.3 Description of ongoing research

This part has a descriptive character and describes the theoretical connection between the professional standard of the teacher and the theoretical approach of transactional analysis applied in the field of education. First, the professional standards of teachers used in the Czech Republic are described and then one of them is selected for further application. The basic concepts of transaction analysis applied in the field of education are also described. Subsequently, knowledge from the professional standard of the teacher and the transaction analysis approach are linked.

It should be noted that authors of the chapter are currently a professional implementers of the research project Model TAPATE and its implementation in the Czech environment. The project is funded under the Operational Program Science - Research - Education Innovation in Pedagogy. This is action research,

where the model created by prof. Julie Hay focuses on the development of teachers' competencies. The inspiration for the work is the involved teachers, who the project works with. The implemented action research is structured in such a way that in the first phase the competencies of the pedagogue are evaluated (through a self-evaluation questionnaire, a questionnaire among students and direct observation). In the second phase, educators complete training in selected concepts of transactional analysis and are provided with ongoing support through supervision. In the third phase, the competencies of teachers are re-evaluated (again, a self-evaluation questionnaire, a questionnaire among students and direct observation in teaching). Action research is now being carried out and outputs will be available once the research is completed.

2.3.4 Practical use of transaction analysis concepts for developing pedagogical competences

The aim of the chapter is to describe the practical use of selected concepts of transaction analysis in the daily work of the teacher. As we stated, we will use the professional standard of a teacher from Kratochvílová and Svojanovský (2020) to connect the competencies of a teacher and transaction analysis. It would be interesting to compare the other competencies mentioned in the chapter Educator and his competencies, but due to the nature of this work there is not enough space.

In the following text, we will present selected activities from individual thematic units and describe how the selected concept from the transaction analysis approach can be used by the teacher. We consider it a use that the pedagogue has not only theoretical knowledge of the concept, but also practical in the sense that he can use it in practice. We will give the concept of contracting (English, 1975) as an example. Theoretical knowledge means that the teacher knows that there are three levels of the contract, namely organizational, psychological and professional. Practical ability is then represented by the ability to negotiate with the other person to set the individual levels of the contract and at the same time to define the area of "what will follow when...". In order to acquire this skill, it is necessary for the teacher to complete training in transaction analysis.

The following are the areas according to Kratochvílová and Svojanovský (2020) and the possibilities of using the concepts of transaction analysis are outlined.

In the thematic area of Teaching Planning, we do not perceive the connection with the concepts of transaction analysis.

In the thematic area Conditions for learning, we perceive connections with the areas of solving disciplinary problems, responding with respect to the needs of students in the classroom and creating space for relief. In the area of disciplinary problems, it is specifically the use of the concept of contracting, which helps to clearly set the rules at various levels (organizational, psychological and professional). In this case, the student may be confronted with clear rules to which they have committed themselves. Since contracting also involves proposing a solution if the agreed rules are violated, the student knows in advance what will follow. This also supports the student's responsibility. Thus, the practical use for teachers is to set up a contract regarding behavior (both on the organizational and psychological level), which will then make it easier for teachers to solve disciplinary problems, because students will know in advance what follows the violation of the agreed rules. We will add the area of psychological games. Knowledge of this concept will support the teacher to be able to deal with conflict situations in a respectful way, or not to play one of the roles in the dramatic triangle through their own reflection. For the area of responding with respect to the needs of students, we perceive the connection with the theory of needs. Needs theory offers an awareness of three basic needs (in transactional hunger terminology) that need to be met. These needs are structure, stimulation and recognition. The teacher supports the pupils' activity by practically fulfilling these needs, giving clear organizational rules for the lesson, including the course, providing a sufficient number of different stimuli (ideally saturating all perceptions) and providing recognition (strokes). The area of creating space for relief can be supported by the ability to use a functional model of ego states in communication and to be able to activate the ego state of the child through communication, especially the manifestations of cooperation and creativity. It is therefore a matter of knowledge of the concepts of the functional model of ego states and transactions.

The topic Learning Support and Transactional Analysis can be linked in the areas of communicating with pupils about the importance of the curriculum and its meaningfulness, as well as in supporting the cooperation and mutual learning of pupils and meaningful work with pupils' error as an opportunity for development. For the area of communication with pupils, it is a question of using a functional model of ego states and transactions, where the pedagogue is able to address all ego states with pupils. The functional model of ego states will also serve to support cooperation between students, where the teacher is able to successfully address the ego state of the Child, which has in it the area of cooperation. Related to this is the area of contracting, where the teacher should be able to set clear rules with the pupils in any activity where cooperation is expected, in order to avoid unpleasant situations (e.g. psychological games). To work with a mistake, the educator can use the knowledge of the concept of

life positions. In the case of the ability to respond to a mistake, I am OK - You are OK supports students to be able to accept the mistake as part of life and at the same time encourages them to correct the mistake.

In our opinion, the field of feedback and evaluation of pupils' results is closely connected with the concepts of strokes and life positions. The educator should be aware of the ways of awarding strokes (conditional positive, conditional negative, unconditional positive and unconditional negative and no strokes). An appropriately chosen stroke can support the students and their ability to provide feedback to others. Within this area, we also see the potential for the use of the concept of life positions, where the teacher teaches students to provide feedback to themselves and other people in a respectful way.

Within the Teaching Reflections section, we do not perceive a significant connection with transactional analysis.

The connection between the competencies of the pedagogue and the concepts of transaction analysis can be observed in the areas of Conditions for learning, Learning support and Feedback and evaluation of pupils' results. On the contrary, we cannot follow the connection with the areas of Lesson Planning and Lesson Reflection.

Due to the nature and scope of this work, only selected concepts were described in the chapter Transactional analysis and its concepts in the field of education. Transactional analysis has a number of other concepts that would certainly find their application. Among other things, we should operate with the idea that it is a psychological approach, so the application in psychotherapy could help educators to personal development, awareness of their life script, which in turn affects how one uses in communication individual ego states, what transactions they choose and what type of psychological games they play to get a particular type of strokes. However, this would mean that teachers should undergo therapy, which is probably unfeasible in the conditions of the Czech Republic.

It should be noted that a certain disadvantage of using the transaction analysis approach in education is that the educator must be sufficiently competent, both in knowledge and the use of the transaction analysis approach. In order to be competent, it would be necessary for the teachers to complete training in selected concepts and at the same time undergo supervision hours with specialists using the transaction analysis approach. In this we come across the willingness and time possibilities of teachers. From our own experience, we can state that educators who have higher competences of teachers are very often interested in education. Those with less developed pedagogical competencies do not volunteer for further education and development.

2.3.5 Conclusion

The aim of the presented chapter was to describe the practical use of selected concepts based on the psychological approach of transactional analysis in the daily work of the teacher. We focused on the description of the teacher's competencies, specifically we elaborated the teacher's activities listed in the professional literature, then on the elaborated teacher's competencies and we concluded the text with the teacher's professional standard. We subsequently used one of the professional standards to connect with the concepts of transaction analysis. In the next part, we focused on the psychological approach to transactional analysis in the field of education and introduced selected concepts. We chose the concepts on the basis of professional literature, which deals with the field of education. This was not an overall list, as the scope of this text does not allow it. In the next part, we focused on the connection of the professional standard of the teacher and selected concepts of transaction analysis. In many areas, the connection is significant and knowledge not only theoretical but also practical can help teachers to fulfill the individual areas of the teacher's activities. There is no link to transactional analysis in some areas. This is mainly a professional area, i.e. when the teachers work with their own approval. Transactional analysis can therefore serve as a useful tool for developing educators' social and communication skills. At least the concepts that have been put forward.

Based on the above, we can conclude that the aim of the chapter has been met. However, as we have already stated, the scope of this work does not allow a more detailed description and analysis of all competencies and concepts of transaction analysis. This would certainly expand the areas of application possibilities of the transaction analysis approach in the work of a teacher.

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3

**APPROACHES TO
THE SUSTAINABILITY
OF QUALITY
VOCATIONAL
EDUCATION IN
THE DIGITAL AGE**

3.1

Digital literacy in transversal competences of future teachers of vocational subjects

Čestmír Serafín

Introduction

Digital literacy has been a much-discussed topic in the context of Czech education in recent years, both the concept of digital literacy itself and the way of its development in pre-school, primary and secondary education. In higher education, this concept is probably assumed in a way and not given much attention at this level. Nowadays, information and digital literacy is imported into the curriculum of primary and secondary schools, and therefore we are mainly concerned here with these educational levels, but in the context of the preparation of future teachers of these levels of schools – we are analyzing the didactic aspects of the implementation of the European Framework of Digital Competences for Teachers in teacher education programmes. We pay special attention to the crosscutting competences, digitalization, systemic relationships and contexts in the teacher competence model, optimized for achieving digital literacy of educational subjects, enabling the subsequent development of digital literacy of pupils. The definitions and conclusions are discussed in the context of foreign sources and the currently addressed concept in the Czech Republic.

Conducting effective teaching is a topic that many educationalists across the world have been working on for decades, even hundreds of years. Their conclusions are varied, their recommendations are supported by much research, but however relevant and scientifically informed these results are based on many circumstances and conditions that are as variable as the living itself.

Effective education and training in a number of areas rests on the quality preparation of the teaching staff – teachers. The preparation of future teachers, whether in pedagogical, science or humanities-oriented faculties of universities, is usually carried out in the context of disciplinary differentiation, which specializes future teachers according to their chosen field of study. Despite all this specialization, however, a teacher comes out of these universities who is primarily trained in pedagogy, didactics or psychology rather than being an expert in the field. But then such teachers educated in the humanities, who teach their subject to, for example, technically oriented students, have to think through their teaching with the specificity of technical thinking in mind. The need for a multidisciplinary approach to the technical, humanities and social sciences is then reflected in practice in the importance of economic, environmental, technical and other demands, which are not always clearly solvable and are sometimes contradictory. In a world built on digital technologies, these issues are particularly important, as it is the multidisciplinary requirements that these technologies bring together and link.

3.1.1 Digital literacy in the context of the European framework of digital competences for teachers

For a decade now, there have been calls in the Czech Republic for the need for a major overhaul of education in the use of digital technologies in the context of education. The concept, which is applied in practice, is already significantly outdated and does not fully reflect the development in the field of digital technologies, but also the needs that society puts (will put) on the student, the future graduate = employee. This concerns not only the skills in controlling technology, which is currently the dominant content of education, but above all the acquisition of competences for safe and effective functioning in the digital world, both in personal and professional life. Education in digital literacy needs to be addressed as a crosscutting theme across all educational disciplines across all educational levels. This, of course, entails achieving a solid level of digital competencies among the educators themselves, i.e. teachers, as this is the only way to ensure that digital competencies are adequately reflected in the style of their pedagogical work in direct teaching.

The issue of digital education was opened in the Czech environment as early as in 2005, when it was becoming clear that digital skills would become a key competence necessary for success in employment, socialization and personal development of each individual. By their nature, we can say that these are transversal competences, as they permeate the educational curriculum in a crosscutting manner. They include not only the ability to use the computer as a tool for work, information skills and media literacy, but also significantly include creativity, independent thinking, presentation and communication skills, teamwork skills, and the whole domain of attitude formation towards personal integrity, moral attitudes, acceptance and practice of ethical principles and tolerance. The modification of the official curriculum documents is therefore on the agenda and with it the requirement to equip teachers with the necessary competences. Their task is to prepare pupils to live and work in a digital society (Redecker, 2018).

Digital Literacy as a concept has been used for many years and could be said to be firmly rooted in the family of literacies such as mathematical, financial, reading and technical, etc. Recently, however, it has become a concept that dominates the field of professional terminology and is very often used in strategic and conceptual materials. This term has a very broad content. Like Digital Competence, it integrates relevant knowledge, skills and attitudes and is seen as a concept that is permeated to varying degrees by other literacies. The term

Digital Skills or Digital Knowledge is also used in conjunction with Digital Literacy.

The concept of digital literacy has been established in the awareness of the professional public mainly thanks to Paul Gilster and his book *Digital Literacy*, published in 1997, in which the author points out the need to acquire new literacy for life in the Internet century. Gilster (1998) defines digital literacy both in a broader sense and in a narrower sense. In a broad sense, it is “the ability to use computer networks to access resources and the ability to work with those resources” (Rosado & Belisle, 2006, p. 5). In a narrower sense, it is “the ability to work in an online environment and to assess online information” (Rosado & Belisle, 2006, p. 5). Gilster understands digital literacy as the ability to understand and use information in multiple formats coming from different sources, not only digital. He stressed that digital literacy requires more critical thinking than technological competences, as this is the only way to make informed decisions in the media world. However, technological competencies are necessary to acquire content. From the above, it is evident that digital literacy is an ever-present need to be able to constantly adapt and develop skills in using new media (Kabel, 2012).

Above all, a digitally literate person should be able to (Bawden, 2008):

- think critically, make informed decisions about the content of the information found, and distinguish between content and form of presentation when evaluating it,
- acquire information and build knowledge from a variety of hypertext and hypermedia oriented information sources,
- manage incoming information,
- be vigilant in assessing the validity and completeness of material retrieved from electronic sources,
- develop a personal information strategy,
- use contact and communication with and get help from other people,
- understand the problem and address relevant information needs.

In 2000, the concept of digital literacy is described in the eEurope document, *Information Society for All*, where it is characterised as the ability to work with the Internet and multimedia resources, the ability to use these resources to learn and acquire new knowledge and skills, and the mastery of key competencies such as competences for collaboration, creativity, adaptability or problem solving (eEurope, 2000). In a somewhat narrower sense, reflecting only the technological aspect and the skills related to the use of the Internet, this concept is reflected in some European Commission documents, where it is understood as the basic

skills in the use of information and communication technologies, computers for obtaining, evaluating, storing, creating, publishing and exchanging information, for communicating and engaging in collaborative (social) networks via the Internet (European Commission, 2002). On the other hand, Covello (2010) presents digital literacy as a concept integrating several specific literacies into one (information literacy, computer literacy, media literacy, communication literacy, visual literacy and technological literacy).

In 2008, Bawden (2008) published a model of digital literacy that distinguishes between the components of four levels:

- a foundation made up of literacy in the traditional sense, i.e. reading and understanding text and knowledge and skills on how to use a computer,
- existing knowledge and experience as the ability to understand today's diverse forms of information and the ability to integrate it into the digital world,
- central competencies, i.e., reading and understanding information, both in digital and non-digital formats, completing and compiling knowledge,
- attitudes, opinions, knowledge and skills formed and acquired in the previous levels set in a socio-cultural framework.

According to Martin (2008), digital literacy also includes the ability to successfully carry out digital activities in everyday life, i.e. involving work, learning, leisure, etc. Calvani, Fini and Ranieri (2009) summarize digital literacy as a combination of concrete and unquantifiable skills: “digital literacy is being able to explore and face new technological situations in a flexible way, to analyse, select and critically evaluate data and information, to exploit technological potentials in order to represent and solve problems and build shared and collaborative knowledge, while fostering awareness of one’s own personal responsibilities and the respect of reciprocal rights/obligations” (see Figure 6).

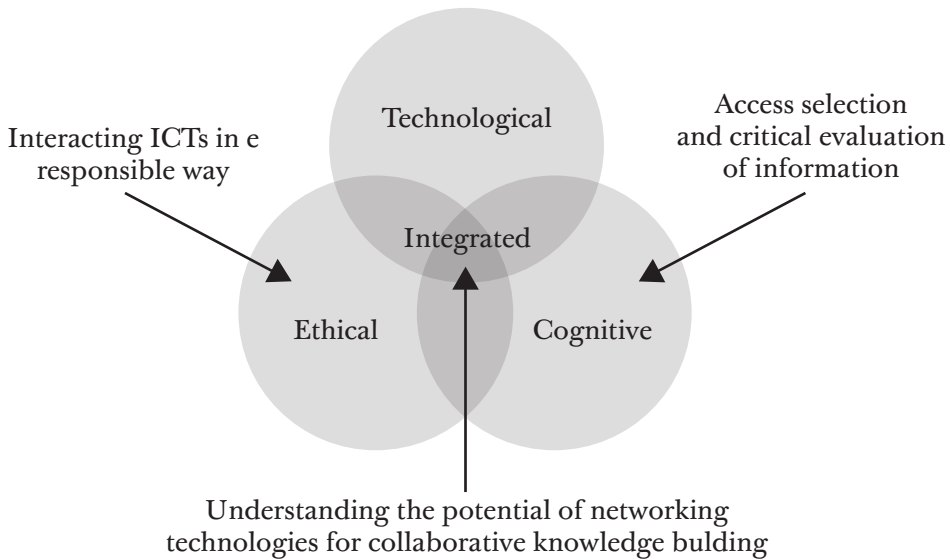
The current conception of digital literacy is related to the concept of digital competences as a set of knowledge, skills and attitudes, including relevant competences in using digital technologies to solve problems, communicate, collaborate, create, share and acquire knowledge effectively, critically, creatively, flexibly and ethically (Ferrari, 2012). Thus, digital literacy (Ala-Mutka, 2011) is conceptualized as encompassing three areas:

- instrumental knowledge and skills for effective use of digital tools and resources,
- advanced knowledge and skills for communication and collaboration, information management, learning, problem solving and meaningful participation,
- attitudes to use skills strategically in an intercultural, critical, creative, responsible and autonomous manner.

Instrumental knowledge and skills are prerequisites for the effective application of knowledge and skills. These are the specific skills needed to use digital tools, taking into account the network, visualisation or other nature of digital assets. The sub-competences of knowing and being able to use digital technologies and relevant software, accessing and using digital media in different formats, as well as knowledge of the legal and ethical context, can be said to fall under this heading (Adamec & Šimáně, 2021).

Figure 6

Intersecting areas of digital literacy



Source: Covello, 2010, p. 4.

Advanced knowledge and skills represent an area of competence that one should be able to apply in a digital environment. These competencies, according to Ala-Mutka (2011), can be broken down into:

- advanced knowledge and skills related to the application of resources, e.g., communicate and collaborate through digital means, search, process information in a hypertext environment, etc.,
- strategic knowledge and skills using digital environments, e.g., adapt to and participate in intercultural digital communication, analyze information content, plan, implement and evaluate activities to meet objectives, etc.,
- knowledge and skills related to personal goals, e.g., “networking” contacts, developing a personal information strategy, etc.

Attitudes in relation to digital literacy are a quality of personality, or a way of thinking, motivation and readiness for activities in the digital world. One is primarily about a willingness to share digital content and collaborate, then a critical attitude towards the information received and one's own reactions to it, i.e., a reflective and analytical approach, then confidence in creating content, communicating and expressing oneself in the digital environment, independence and determination to achieve goals, and last but not least a safe and sensible approach to digital activities. Thus, these are attitudes of interculturalism, critical thinking, creativity, autonomy and responsibility.

Digital literacy is thus currently perceived as a broad concept that overlaps in various ways with other literacies that contain sub-components of both information technology and digital literacy.

In the European Commission's 2002 concept, among the eight key competencies set for the compulsory primary education stage, the third is "ICT Competence" (European Commission, 2002). This competence is defined here as the confident and critical use of Information Society Technology (IST) in work, leisure and communication. Basic knowledge of ICT, i.e. the use of computers, is a prerequisite. Following the explicit inclusion of 'digital competency' among the key competencies for lifelong learning, research activities have been carried out to specify it more precisely. One of the most important projects was undoubtedly the Digital Competence Project (DigComp), which was carried out by the Joint Research Centre's Institute for Prospective Technological Studies in 2011-2012 (Ferrari, 2013).

In 2017, the DigComp 2.1 digital competence framework was published, redefining the levels of achievement of each digital competence that had previously been specified in 2016 within the DigComp 2.0 document (Carretero et al, 2017). This European framework updates the previous 2013 concept defined in DigComp 1.0 (Ferrari, 2013) and divides the digital competences into five areas:

1. information and data literacy,
2. communication and collaboration,
3. digital content creation,
4. security,
5. problem solving.

Each of the above areas includes several more specifically targeted sub-competences. However, these competences do not include technological competences, which can be understood as the set of skills and knowledge needed to operate digital technology software and technology. While these competences

can also be seen as a necessary precondition for the above competences and can thus be reflected in all five of these areas, when considering the development of digital literacy in education, it seems more appropriate to specify this area separately, as technological literacy is and should continue to be a fundamental part of education.

3.1.2 Changes in the primary and secondary school curricula – implications for the preparation of future teachers

The revision of the curriculum in the area of digital literacy development was initiated by the Digital Education Strategy 2020, which was approved by the Government of the Czech Republic in 2014. This strategy set three priority objectives:

- to open education to new methods and ways of learning through digital technologies,
- improve pupils' competences in working with information and digital technologies,
- develop pupils' computational thinking.

Of the proposed objectives and related measures, the emphasis on digital technologies and information literacy across educational areas is particularly relevant in curriculum innovation. The purpose of the revisions and updates of the curricula is thus to modernize their content, particularly in their vocational component, in line with the above. At the same time, however, a new educational area is being created, aimed specifically at computer science education, which aims to teach pupils to think computationally: it is intended to give them the ability to analyze and define a problem precisely, to determine the means and optimal path to its solution, to generalize solutions to similar problems, to express workflows so that they can be carried out by another person or machine, and to represent situations or processes using models. The area should thus contribute to enhancing the ability to handle common situations creatively and independently. Pupils should also be able to use different types of digital devices, including connecting them to the internet (Adamec & Šimáně, 2021). They should know the possibilities and risks of the Internet and act accordingly. In this context, this is structured under four headings:

- Data, information and modelling - the aim is to teach pupils to distinguish between data and information and to be able to handle both appropriately. Data are facts of life, facts that can be perceived but also recorded and

digitized. Information is the interpretation of data, the inference of input data, the answer drawn from known data. Emphasis is placed on the appropriate use of different data formats, data types or encoding, data compression, etc. This is further related to the presentation of reality through abstractions such as models and simulations, as well as the ability to define a problem and determine the requirements for its solution.

- Algorithmization and programming – the aim is to lead students to express ideas and procedures accurately. The focus is on creating unambiguous and sufficiently general workflows of a finite number of steps (algorithms) and formally recording them.
- Information Systems – the aim is to understand a system as a collection of parts that have certain relationships with each other. At the same time, the processes (information flows) that take place within the system should be seen as part of the system. The focus is therefore on defining and modifying the parts of the system and the relationships between them. Students should acquire the ability to decompose systems and their internal processes into parts and to define their relationships and structure.
- Computer and its operation focuses on the different types, internal structure and operation of digital devices, their networking and connection to the internet. Pupils should be able to identify and resolve technical faults or recognize non-standard behavior of equipment and refer to experienced persons (according to the category of education attained). They should be aware of security risks on the internet, protect digital devices and their content by following security rules, recognize suspicious behavior, know about the digital footprint and their identity on the internet.

Another topic is People and the Digital World, which is about integrating digital technologies into teaching in all educational areas and in the vocational component. The use of technology is thus based on the needs of the area or field of education in question. In language education and communication, technology can be used to express opinions or to present them. In social science education, for example, the legal context is relevant, i.e. compliance with standards, including copyright law. In science education, technology can be used for research and experimentation, processing and evaluating data. For mathematics education, tools that allow the representation of results in graphs, etc. are useful. Pupils should acquire the ability to use digital technologies in everyday situations so that they are not just an alternative way of dealing with a situation, but to deal with it more efficiently and conveniently using technology.

Digital literacy functions as a key competency in the sense that it develops general goals such as creative approaches to problems, responsible interaction with others, but also the ability to keep learning, i.e. not to fixate on one type of

technology and to be able to use other, new devices and applications in an effective and creative way. The aim is to teach critical thinking in the acquisition of data and in its further processing, to be able to assess the credibility of the source and the completeness of the data obtained, to perceive and evaluate the potential and risks of engaging digital technologies in different situations. In general, the aim is to ensure that a student or school graduate is able to navigate the digital world in a purposeful, considerate, critical and safe manner, not only at work and in learning, but also in their free time.

Teacher competencies include critical thinking, communication skills and information literacy. These competencies should be one of the foundations of teacher training (of course, outside the teacher's own expertise). Teachers today can teach quite creatively, using a wide range of modern technologies, they can teach in projects, in groups, they can make teaching more varied by using digital technologies. This, of course, presupposes the teacher's own digital literacy.

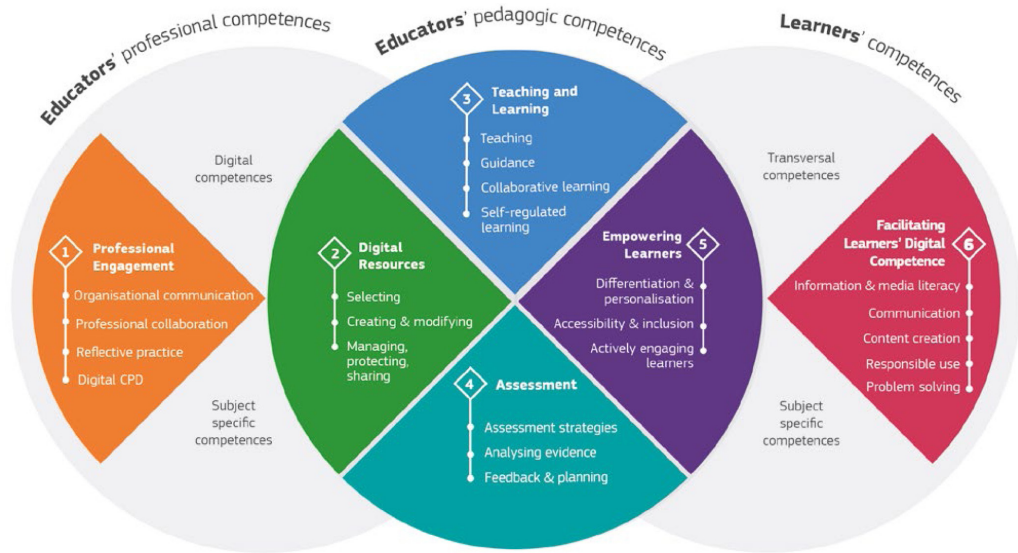
3.1.3 Incorporating transversal competences into teacher training

Although there has been discussions for decades about the necessity of changing the style of pedagogical work in schools, and extensive research has been conducted on this topic, a transmissive style still prevails in the form of monologic verbal methods and underestimation of learners' activation in direct teaching (especially with digital tools), which is manifested in the criticized encyclopedism and memorization. Thus, contemporary education does not sufficiently develop even basic key competencies, and the same would be true of digital competencies. This handicap of the Czech education system could be addressed by a higher level of use of activating methods and a greater use of integrated forms of teaching. High didactic effectiveness and growth of learners' motivation has been demonstrated in the application of electronic simulations (online simulation games), research and project-based learning, etc. (Králová, Novák, Eds., 2014).

Effective teaching management at the level of contemporary requirements for modern teaching means for teachers to have developed digital literacy and motivation to constantly work on themselves not only professionally, but also in the field of digital literacy. Digital literacy not only gives teachers the opportunity to use digital technologies and resources to directly support teaching, but also to interact much more effectively with colleagues, pupils and parents, as well as for their own professional development. The trajectory of the systematic transfer of transversal competences in the relationship between the teacher and their competences can be seen in the diagram in Figure 7.

Figure 7

Digital literacy and transversal competence



Source: <https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>

Functional integration of digital technologies into teaching implies a change in teaching style from executive to facilitative, where the teacher becomes the facilitator, as learners are more independent in their use of digital technologies and need more guidance, indirect guidance and support. A digitally competent teacher must be able to implement digital technology supported learning activities aimed at developing learners' independent learning as well as group work. Digital technologies enable the optimisation of existing strategies for reflective practice and assessment of teaching, both in the area of formative and summative assessment, including systematic access to evidence for evaluating teaching processes.

Teachers' level of digital competency has been the subject of much research globally. For example, in Ukraine research showed that teachers had above average levels of digital competency that did not depend on how they acquired their skills (Kuzminska et al., 2018). Research from New Zealand has yielded findings that the use of digital technology in the classroom correlates with the level of digital competency (Madsen, Thorvaldsen, & Archard, 2018). The positive relationship between beliefs about one's own digital proficiency and willingness to incorporate ICT in the classroom is also highlighted by Player-Koro (2012). He also notes that teachers who believe they are digitally proficient also believe that incorporating digital technologies will enhance instruction and contribute to student learning.

Lee, Smith and Bos (2014) see three main groups of teachers' attitudes towards information technology. The first group includes teachers' positive attitudes (integrating technology into teaching is "exciting"). These teachers understand modern technology under the influence of current trends without reflecting on how it relates to educational content. Another group has pragmatic attitudes, where the use of technology is in terms of facilitators to support the success of teachers and students. The final group are purely pedagogical attitudes, where technology is intended to assist learning, offering greater breadth and innovation in educational methods.

The integration of information and digital technologies into teaching is related not only to the experience and level of development of digital competencies, but also to teachers' attitudes towards these technologies. In this context, the results suggest several tendencies. For example, in research in New Zealand, the use of digital technologies was positively correlated with the level of digital competency (Madsen, Thorvaldsen, & Archard, 2018). Conversely, research conducted by Liu (2011) revealed that teachers' beliefs about the use of ICT in education and their actual practice can be very different.

A body of research shows that current and future educators largely acquire their digital knowledge and skills through self-directed learning (Fraile et al., 2018). Similarly, Finnish research has yielded the finding that teacher education in ICT does not take place so much through training and courses, but rather through teachers' self-education, supported by friends and colleagues (Røkenes & Krumsvik, 2016). In contrast, research from other countries has repeatedly confirmed the influence of the inclusion of digital competency development programmes in both teacher training (Mahmud & Ismail, 2010) and in-service teacher education on the formation of teachers' digital competency.

3.1.4 Methodology and aim of the research investigation

The development of digital competencies can therefore be fully considered as one of the general objectives of education, which concerns both the learner and the teacher, and the teacher in particular. Although many teachers – unlike today's students who have already been born into the digital age – cannot be considered 'digital natives', it is essential to ensure that teachers actively participate in the general objectives of education. The research, which was conducted in the early 2020s, focused on future teachers of the Faculty of Education and aimed to identify certain knowledge and user specificities in their digital competencies.

The main research question was posed as follows:

What knowledge and user specific digital competencies are manifested in prospective teachers?

This question has been concretised through sub-research research questions:

1. Are there specificities of future teachers in the use of digital technologies in teaching?
2. Are there differences in the subjective perception of ICT knowledge among prospective teachers?

A self-constructed questionnaire was created for data collection. The content of the questionnaire was developed on the basis of the analysis of research studies, strategic documents of the Ministry of Education, Youth and Sports of the Czech Republic and the European Commission concerning the creation of the necessary framework of digital skills of the citizens of the European Union. In terms of structure, the questionnaire consisted mainly of multiple-choice items, some of which use Lickert-type scales, while others allow the answers to be selected or sorted. Some items could also be supplemented with the opinion of the respondents themselves. The questionnaire was implemented in an online form using Google Forms.

The sample of respondents ($n = 2015$) was made up of future teachers of the Faculty of Education of Palacký University in Olomouc. The sample consisted of 1 298 women (64%) and 706 men (35%). An additional 24 (1%) respondents did not indicate their gender. In terms of the level of education in which the respondents were, 1,671 (82%) of the respondents were in a master's degree, 135 (7%) in a doctoral degree, and 209 (10.4%) in a bachelor's degree.

On the basis of the item identifying the approved subjects, the prospective teachers were given due to the large number of subjects, they were classified according to the major. The field affiliations are shown in Table 6. It shows that the dominant group in the sample is teachers majoring in special education, followed by teachers of mathematics, science, and social studies. Prospective ICT teachers are also a large group. Teachers mainly in education such as technology, art or music are represented below 10%, while below 5% of future teachers are for primary school and kindergarten, languages and physical education.

Table 6*Respondents' sectoral ranking*

Field of study	n	%
Special education	643	31,9
Mathematics and natural sciences	317	15,7
Social sciences	296	14,7
ICT	208	10,3
Technology	163	8,1
Art Education	137	6,8
Music Education	101	5,0
Languages	70	3,5
Primary school and Kindergarten	55	2,7
Physical Education	20	1,0
N/A	5	0,2
Total	2015	100,0

3.1.5 Results and discussion

In this section, we present the main research findings. In relation to all research questions, we conducted descriptive analyses of the relevant data.

Are there specificities of future teachers in the use of digital technologies in teaching?

In this section, we present findings on what technologies prospective teachers would use for teaching purposes.

ICT resources used by teachers for communication

In the first block of questions, we asked respondents how often they communicate on the Internet using e-mail, applications (Skype, Messenger, WhatsApp...), discussion forums (chat rooms, blogs) or social networks. The answer options were on a four-point scale with the grades: 'always', 'often', 'sometimes' and 'never'. Of the above mentioned means, respondents use social networks most often (99%), and 82% often. The second most used means of communication are apps (Skype, Messenger...), but the frequency of use is much lower compared to discussion forums. Everyone uses this medium at least constantly in 48% and frequently in 20%. The third most frequently used means of communication, according to our findings. Of the total respondents, 40% of respondents use them

at least sometimes for communication and 15% often. Emails are the least used form of internet communication for our respondents. The results of the whole sample show that 19% of respondents are frequent users.

Specifics of the use of social networks

In the next part of the questionnaire, we were interested in how often respondents would use social networks such as Facebook, Twitter, Instagram, etc. for educational purposes. Moreover, this question corresponded well with our previous answers, where respondents preferred social networks for communication. For the answers we offered a scale with extreme points “always” and “never”.

Of our offerings, the most frequent use of Instagram by respondents for teaching would be several times a week (42% of all respondents and 47% of humanities oriented). The second most frequently used network would be Facebook, 22% of respondents would use it several times a week. The use of other social networks for teaching-related purposes was absolutely negligible among our respondents.

The results showed that the frequency of use of these networks for the purpose of pedagogical interactions is overall rather average among prospective teachers. It also showed that the responses of all the respondents in the division between rather humanities-oriented and science-oriented were almost identical and without statistical significance.

Following on from the previous questions, we further asked what specific respondents would use these social networks for. We offered four options: to observe pupils’ activities on social networks, to inform pupils about teaching, to share files, teaching resources with pupils, and to interact informally with pupils. Prospective teachers would use social networks frequently to inform pupils about teaching in 58%, to share files and teaching resources with pupils in 49%, to interact informally in 35% and to observe pupils’ activities on social networks in 18%.

Digital services and software used for teaching

We then asked respondents several questions regarding the frequency of use of digital services for learning. We offered respondents cloud services, graphic editors, presentation software, QR codes, OneNote. Here again, the ‘sometimes’ option was the most chosen choice for teaching, with 92% of respondents using presentation software at least sometimes. Graphic editors were the third most used digital service (61%). Here, a subject specificity was already evident, with 64% of future teachers of technical, computer science, mathematics and science disciplines preferring cloud-based services, QR codes, to other disciplines. The difference here appears to be statistically significant ($p < 0.001$). On the other hand, OneNote is the least used (12%).

Digital educational resources

We also asked about the frequency of use of some digital educational resources, such as e-books, videos and audio recordings (e. g. YouTube), webinars, open educational resources, virtual and remote labs, teaching applications, e-learning. The responses show that the results within the respondents' disciplines are again very similar. For each option, "sometimes" was again the most frequently selected option. They would occasionally use videos and audio recordings (92%), e-books (76%) and learning applications (67%). E-learning would be used at least occasionally by 34% of respondents. They would work least with virtual and remote labs (10%). However, this is where the difference for science-oriented respondents became apparent, where 30% would prefer to use virtual and remote labs ($p < 0.001$).

The use of digital technologies in teaching for didactic purposes

The last topic of this part of the questionnaire was to find out what didactic respondents would use digital technologies. They were offered answers inspired by Bloom's taxonomy, i.e.: for students to remember the material, for students to understand the material, for students to analyze problems related to the material, for students to be able to apply the knowledge in practice, for students to form an overall picture of the issues, for students to realize the meaning of the material for practical life. Thus, the three most frequently cited reasons were to understand the material (89%), to form an overall picture of the issues (82%) and to remember the material (81%). The least frequent response was the reason for analyzing problems related to the curriculum (49%). There were no statistically significant differences between respondents by discipline in any of the examples given.

Are there differences in the subjective perception of ICT knowledge among prospective teachers?

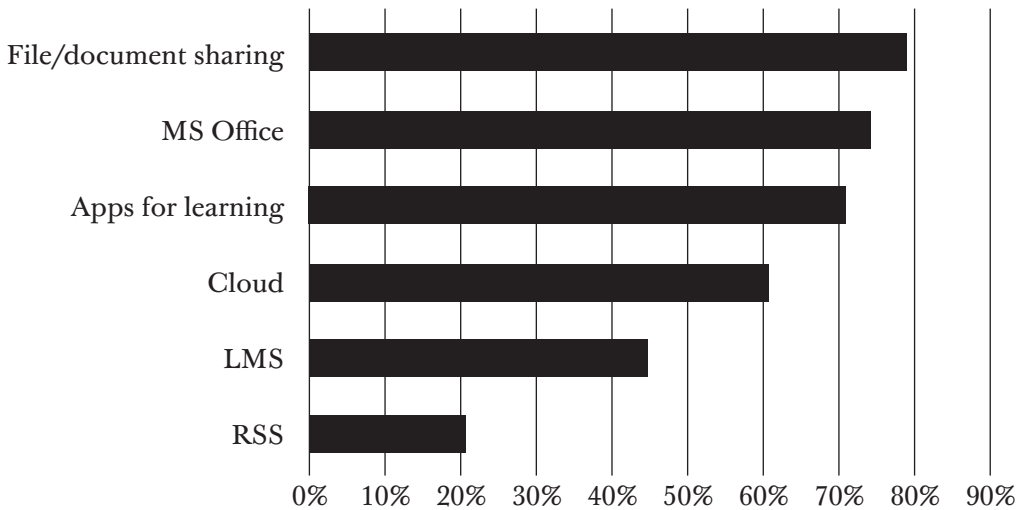
Subjectively, perceived knowledge and skills can be considered as significant predictors of willingness to use ICT in education (Krejns et al., 2013). Therefore, the alignment between knowledge and practice can be seen as an important factor for the integration of ICT in learning and the development of digital competencies. We were therefore interested in how prospective teachers assess the depth of their knowledge. Respondents assessed the extent of their knowledge in five areas: software, hardware, digital communication, digital learning, and digital security. Respondents were also asked to rate on a scale of 1 to 4 whether they could explain the concepts to them to their students, with 1 = definitely yes, 2 = rather yes, 3 = rather no, 4 = definitely no.

Level of software knowledge

As shown in Graph 8, the cumulative frequencies of positive responses (definitely yes and somewhat yes) in the software area are as follows: most respondents are confident in their ability to explain what file and document sharing means (79%), MS Office applications (74%) and learning applications (71%). Just over 61% could explain what cloud services mean. However, 45% could explain the term LMS and only 21% could explain RSS.

Graph 8

Level of software knowledge

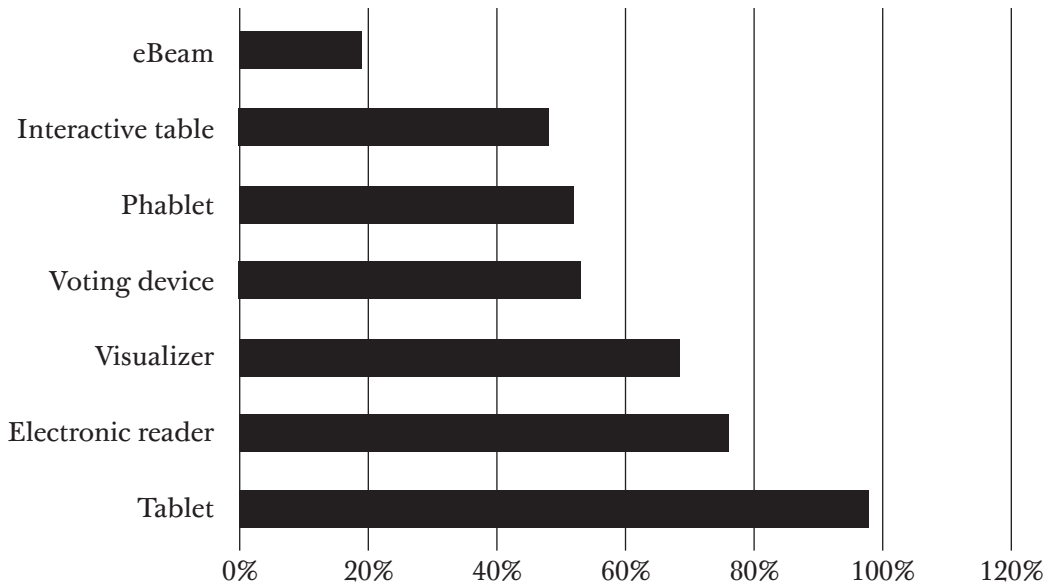


Level of hardware knowledge

In terms of hardware knowledge (Graph 9), the cumulative frequencies of positive responses (definitely yes and rather yes) in this area are as follows: almost all respondents (97%) could explain what a tablet means to their students, 76% could explain an e-reader, 68% could explain a visualizer, 53% could explain a voting device, only 52% could explain a phablet, 48% could explain an interactive table and only 19% could explain an eBeam interactive tool.

Graph 9

Level of hardware knowledge

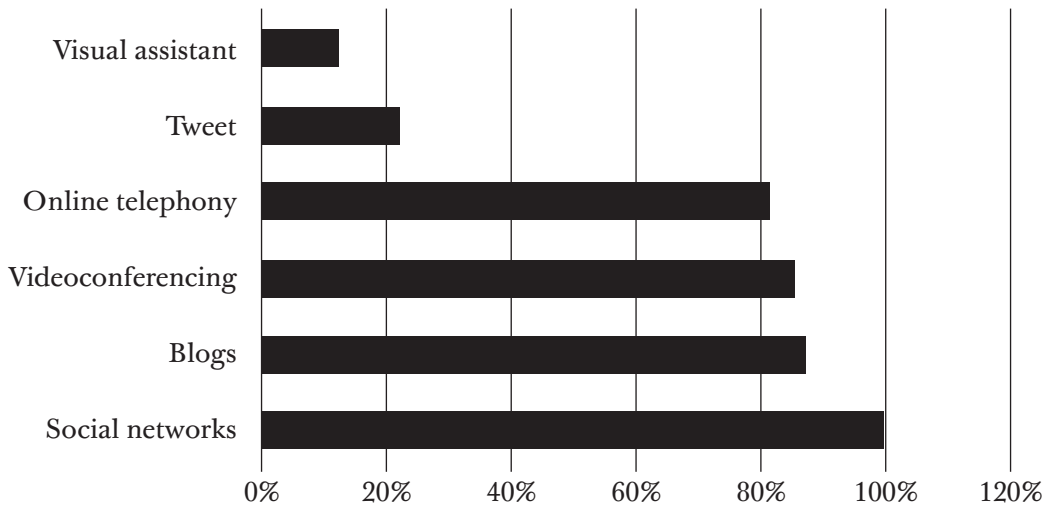


Level of knowledge in digital communication

The cumulative frequencies of positive responses (definitely yes and rather yes) in the area of digital communication (Graph 10) show that prospective teachers would be best able to explain the following concepts: social networks - e. g. Facebook (99%), blogs (87%), video conferencing (85%), online telephony (81%). They were less likely to be able to explain concepts such as tweets (22%), personal assistant - virtual, digital assistant (12%).

Graph 10

Level of knowledge in digital communication

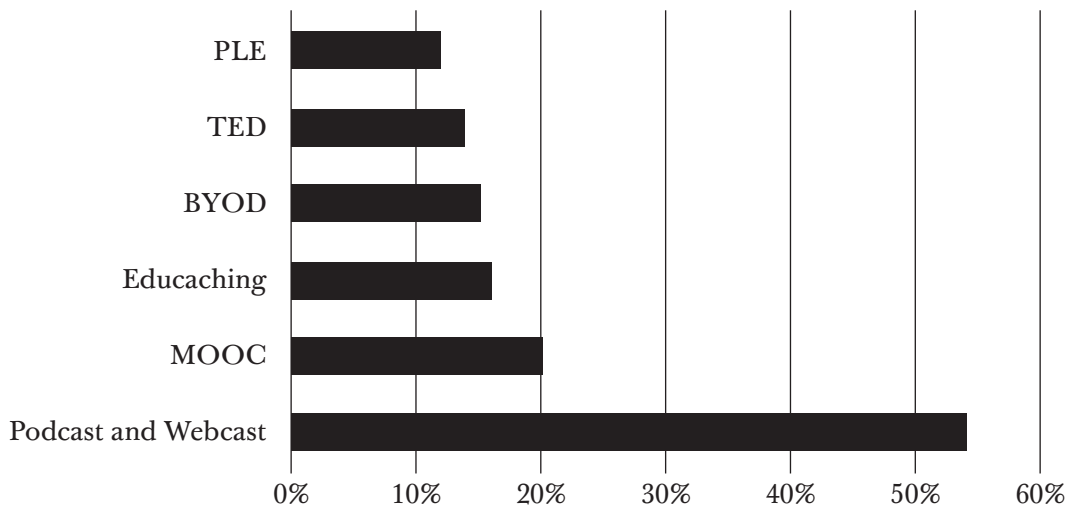


Level of knowledge of digital learning

Digital learning concepts shown in Graph 11. For example, concepts such as podcasting and webcasting could handle only 54% of respondents could explain the concept of educaching, 16% could explain it meaningfully, and only 15% could explain BYOD. Only 14% know the acronym TED, 12% of respondents could explain personal learning environments - PLE, 12% could explain gamification and only 20% of teachers could handle the acronym MOOC. Except for the items TED, podcast and webcast, the differences proved to be statistically significant ($p < 0.001$).

Graph 11

Level of knowledge of digital learning

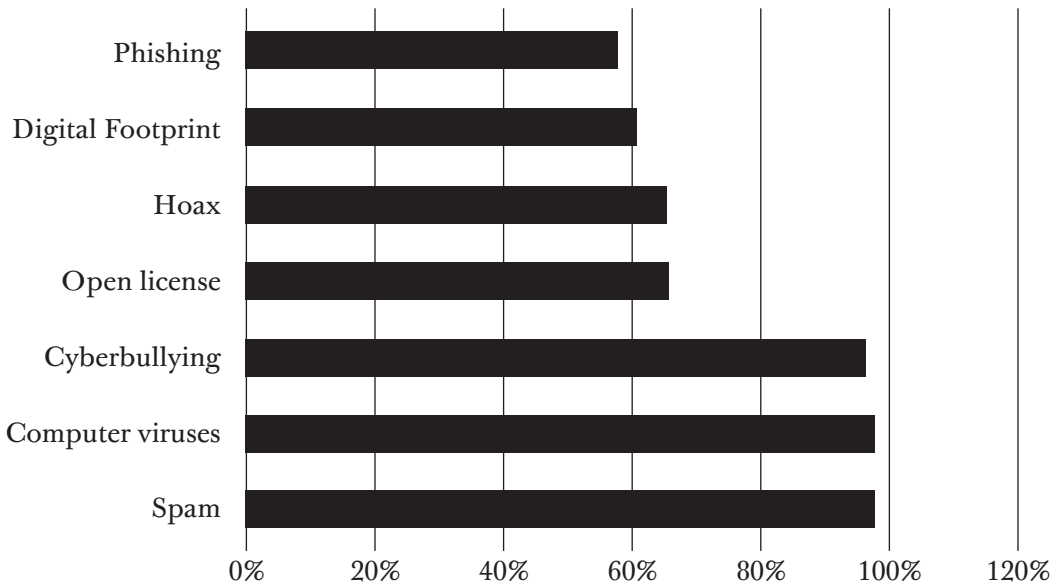


Level of knowledge in digital security

The cumulative frequencies of positive responses (definitely yes and rather yes) in the area of digital security (Graph 12) show that respondents would have the least problem with the explanation of the terms spam (98%), computer viruses (98%), and cyberbullying (96%). They are less familiar with terms such as open license and content (66%), hoax (65%) and digital footprint (61%). They are less likely to be able to explain the content of the term phishing (58%). Interestingly, however, there was no drop in this important area subjective rating of understanding for any of the concepts below 50%.

Graph 12

Level of knowledge in digital security



3.1.6 Conclusion

The issue of digital literacy in the context of education has been actively addressed for many years in various ways in terms of the breadth of competences, the intersection with related concepts and, last but not least, in terms of regional or national concepts. An integral part of this issue is the definition of digital literacy in terms of cross-cutting competences reflecting disciplinary diversity, which is particularly important when preparing future teachers for school practice.

The chapter presents data from a larger research project aimed at identifying teachers' digital competencies, with an emphasis on some areas that may be relevant from the perspective of the practising teacher and their digital knowledge and competencies.

Our research has shown that pre-service teachers have an awareness of digital issues in education and the necessity of their digital literacy for the future of their profession, that they use digital resources and have some insight into the didactic and methodological use of digital and information and communication tools in their own teaching. However, they perceive a number of areas related to, for example, cloud services etc. significantly less strongly than would be desirable. It also emerged that although the respondents see the pedagogical potential of digital technologies positively, they are relatively less familiar with certain forms and means of digital teaching. Thus, a certain discrepancy can be noted between the expectation of pedagogical effects of the application of digital technologies and only partially or moderately developed knowledge and user aspects of their application in teaching. However, this situation is not so pronounced in the incoming generation of teachers that it cannot be developed in practice in the form of lifelong learning. At the same time, however, there is a need for faculties of education to focus more on preparing their students in this area, across the curricula they guarantee. It can be said that as digitalisation permeates the education of pupils in individual subjects in primary and secondary schools, it needs to permeate to a greater extent the subjects of education in teacher training colleges.

The results described in this chapter capture a certain state of development of digital competencies in prospective teachers, practically at the beginning of the COVID-19 pandemic outbreak, and during that time it can be assumed that there has been a certain shift that our research will reflect in the future. However, based on these findings, it can be concluded that digital technologies are very important to future teachers and that they are aware of this.

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3.2

Introducing of a coaching approach to online teaching as a support of communicative competence of teachers and students from a didactic point of view

Kateřina Tomešková, Petr Svoboda

Introduction

Trends in contemporary education focus mainly on reviving teaching with modern approaches. Current topics that have been frequently discussed among university experts in recent years include the use of coaching and mentoring in academia or other work environments. Efforts to find a serious answer to the question “How to use coaching style in support of a new culture of education?” Have a chance to inspire teachers to make changes “for better learning”. The aim of the presented chapter in the field of reflection on (in) education is to acquaint university teachers with the pedagogical reasons for introducing a coaching approach to teaching and to introduce them to the benefits arising from the use of coaching skills in leading students. The content of the article is supported by the author’s sharing of newly acquired experience from teaching with the help of MS Teams in measures related to the coronavirus pandemic. In order to find out – whether it was really possible to impress, convince and get students of online lectures – a qualitatively oriented survey was conducted at the MÚVS ČVUT in the academic year 2020/2021. The aim of the preliminary research was to map mainly those teaching situations which were aimed at ensuring a suitable communication climate and which were helpful in addressing the negative effects of the crisis on the perception, understanding and development of students’ thinking. Another goal was to monitor how students react to the chosen ways of pedagogical communication and identify their preferences with regard to the support of motivation to learn.

On a daily basis, we encounter situations where people focus more on what they say than on what they say when they talk to others or present a topic. The question for discussion remains whether we teachers also pay the most attention when teaching professional content. Based on a qualified estimate, we can say that making a conscious decision in this context – how the topic should be communicated so that knowledge transfer is as effective as possible – has never been a priority for most of us. At the same time, mastering the means of pedagogical communication belongs to the professional standards of teachers, not to mention the obligation to apply effective ways of communication with pupils and students.

This is despite the fact that in the course of our studies or subsequently in teaching at various levels or types of schools (probably several times) we have encountered a well-known lesson regarding the influence of the presenter on others, where words have only minimal meaning (7%). It is said that 38% of acoustics, modulation and tonality of the voice and 55% of body language decide whether you get others on your side or not. Supported by the so-called Mehrabian numbers (7-38-55), which represent the percentage of speech content

- voice tone (vocal communication) - facial expressions in specific situations (Mehrabian & Ferris or Mehrabian & Wiener, both 1966), it is suggested that that how much people remember from our message or how much learners take away from teaching is mainly determined by our voice and our body language. Despite their high popularity, the lesson of American psychologists at the very end of the 1960s is still one of the most cited in the field of communication, despite the need to approach it with certainty and to take into account certain limitations.

The fact that the conclusions of the experiments of Mehrabian and his colleagues have been reinterpreted in many different places in recent years (mainly due to ignorance of their contextual facts) then logically leads us to look at them more or less critically and more perceived more than half a century. as a call for further study of nonverbal communication. In addition, today's information and knowledge age is characterized by attempts to redefine the entire framework of the learning society. At a time of rapid development of modern technologies and industries, including different life patterns, the demand for new skills is increasing. These - with regard to the topic - include, for example, critical thinking and asking the right questions or a deliberate effort to understand the opinions of others and to understand the problem as a whole (Cisco, 2010). It is logical to see the current situation as a challenge for teachers who have to respond flexibly to current changes in society and begin to focus intensively on the development of social, psychosocial and communicative competences. It should be added that the willingness of teachers to understand the importance of progressive educational tools and their ability to include them in their own teaching is closely related to this. The strategic document The Learning Society (Cisco, 2010) also reads about the need to develop the learner in another cognitive area, namely the ability to communicate effectively and often use technology. The demand for more effective communication skills and the real use of new approaches and resources therefore goes to all participants in the teaching process. Last but not least, communication and collaboration skills are also one of the six areas defined for digital technologies in education (Neumajer, 2010).

Innovative teaching through new technologies and online tools is often spoken of. The growing attention focused on the competencies required by the information society is leading individual schools and the whole education system to introduce the necessary changes within their curricula. The aim of current education is to develop students' digital literacy and thinking in the field of informatics, to improve their competences for working with digital technologies and to introduce new learning methods (Svoboda et al., 2020). The change in the content of education accompanied by the expanding requirements for teachers' competences is reflected in the number of scientific studies, research

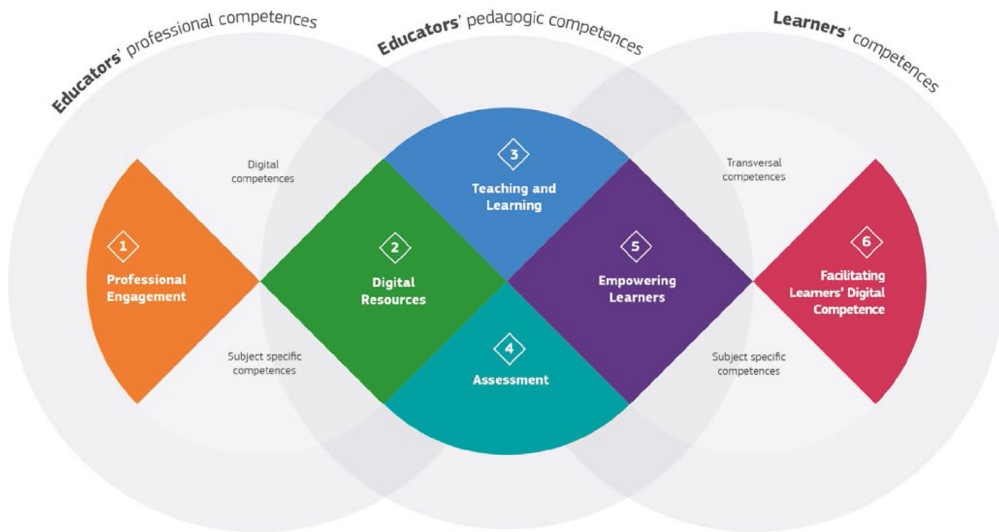
plans and scientific literature (Svoboda et al., 2020). The development of online tools is dynamic. This is due to the rapid development of technology and digital trends. The results of a research project entitled Development of digital competencies of social science teachers at secondary vocational schools (Svoboda et al., TACR, 2018–2021) showed that the use of digital technologies in teaching improves students' knowledge, skills and abilities and increases their motivation to learn, their self-confidence and activity. In this context, students are motivated to use other digital technologies, especially interactive touch devices. As part of this, social networks and cloud services are used to enable online communication between students, educators and other stakeholders. Documents are shared and online communication helps solve problems in a short period of time (Svoboda, 2020).

There are more and more models trying to describe an individual's key skills for success in the 21st century. One of them is also a model called 21st Century Learning Design Rubrics (Microsoft, 2012). Within it, the researchers defined six main groups of characteristics of teaching activities and at the same time the skills of pupils and students that can be supported by them. With the growing interest of society in ensuring the quality preparation and implementation of these activities – such as creating suitable opportunities for the possible use of information and communication technologies (ICT) for learning and training advanced communication – the question of how they are teachers are prepared to provide targeted support for the development of these pupil and student competencies.

Digital competences are essential to today's key preparedness for success in the 21st century. Teachers' digital competences include the ability to recognize the educational potential of digital technologies and are important for motivating teachers to implement change, school development, ad-hoc situations, the ability to communicate and work through digital technologies, training in in-service training and facilitating the integration of new ones. technologies in teaching (Svoboda, 2020). In 2019, the Ministry of Education, Youth and Sports published the Teacher's Digital Competences Framework, which is based on the Czech translation of the DigCompEd European Framework of Digital Competences for Teachers (see Figure 8 and 9, MŠMT, 2019).

Figure 8

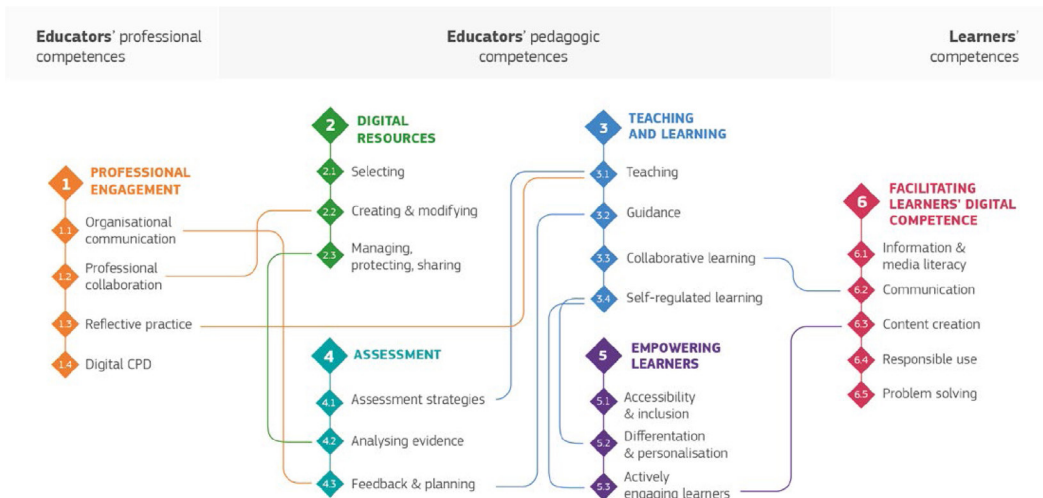
The european framework of digital competences of educators



Source: Learning Path (2021), EU Science Hub (2021), DigCompEdu (MŠMT, 2019)

Figure 9

The european framework of digital competences of educators



Source: Learning Path (2021), EU Science Hub (2021), DigCompEdu (MŠMT, 2019)

Last year, which was marked by a coronavirus pandemic all over the world, various measures began to be implemented not only in our country, which were supposed to reduce the rate and extent of the infection or mitigate its effects on society. One such measure was the closure of Czech schools (MZČR, 2020), when all teaching moved to virtual space. The Ministry of Education, Youth and Sports has issued a set of best practices and, together with the National Pedagogical Institute, has launched the “Education # NaDálku” portal (MŠMT, 2020), where links to various webinars, procedures and advice for communicating with pupils, tips and teaching ideas and links to examples of good practice. The support of online education in primary schools has become a living topic, which has been richly discussed in our country for many months across the professional and lay public. Although education, which builds on the development of information technology and the Internet, has been a great success during this challenging period, especially for high school and university students, and has received unprecedented support from other educational institutions that have created an environment for sharing educational materials or free made available commonly paid licensed electronic resources, system solutions focused on the development of skills of Czech teachers working at higher levels of schools in connection with the transfer of education to the online environment did not emerge. The forced transition to online teaching has brought a number of risks and problems for both parties to the pedagogical process. Unfortunately, its negative effects on university students, who were generally assumed to choose their own “learning” strategy, were talked about quite slowly in the Czech public sphere.

3.2.1 Objectives

Due to the neglect of this issue in the local public debate and the lack of support for the steps needed to implement a systemic solution in online higher education, reflective practitioners themselves have begun to find the right answer to a crucial question – **“how to strengthen the lack of motivation who are educated only in a virtual environment?”** At a time when, after many months of lockdown, measures at the universities against the spread of covid-19 were finally relaxed, suitable conditions arose so that a stronger appeal could be made to develop a discussion on the subject among teachers. This was accompanied by more frequent invitations of practitioners to present improving proposals for online teaching for those interested from a wide pedagogical community, including the sharing of examples of good practice.

With regard to the ever-increasing demand of the academic public to expand the pedagogical role of the tutor as an expert, teacher and advisor in one person, we at the Masaryk Institute of Advanced Studies of the Czech Technical

University in Prague focused on the implementation of a qualitatively oriented survey. The intention was to find out – how we managed to minimize problems in our own teaching and to really impress, convince and gain students of online lectures. The aim of the research survey, which took place in the summer semester of the academic year 2020/2021, was to map learning situations that aimed to ensure a suitable communication climate and which, after incorporating alterations, should help address the negative effects of the crisis on students' perception, understanding and development. Another aim of the chapter is to present the findings of the described research (supported by the sharing of examples of proposals for “improving” changes). Our intention is to provide practical advice to those interested in the general pedagogical community on the introduction of coaching approach and teaching skills, which were verified during the survey and which can be considered didactically useful in connection with the general interest in improving the quality of higher education.

3.2.2 Theoretical framework

First, we dealt with selected aspects of educational reality. By comparing traditional classroom communication with current means of electronic communication (e.g. e-mail, chat, social networks, online communication, LMS, MOOC, webinars, cloud services usable in education). We know that communication in schools has traditionally been focused on direct verbal and nonverbal contact. We now have online electronic communication (synchronous or asynchronous) in the educational area. There is often talk of creating the conditions for a flexible, more accessible and individual learning process, improving the work of teachers and strengthening their competences in removing barriers to equal access to education. Currently, online communication, blended learning, gamification, digital educational resources, combinations of e-learning, m-learning, online and offline courses are common support for learning (Svoboda, 2020). For example, virtual classes, microlearning and education in 3D virtual reality come to the fore.

We also focused on the negative aspects of online teaching. Experts from the pedagogical field of science have pointed out possible negative aspects of online teaching before (cf. e.g. Zlámalová, 2007; Bednaříková, 2013), who included insufficient motivation to study or its gradual loss during their studies. They also drew attention to the possibility of feelings of loneliness during the study, small study skills and study habits, lack of time for self-study (objective and subjective), or a barrier for potential students, especially older individuals, technophobics, socially weaker individuals without access to ICT, etc. (Zlámalová, 2007, p. 37). In this context, it is also important to recall that if the teaching of pupils and students in an online environment is to be effective

and the key teaching situations are to meet at least a stimulating level of quality, then its implementation requires the use of special didactic approaches and methods. As a result, there is a significant shift towards a constructive approach, where the students must increasingly construct their knowledge themselves. In addition to creating an interactive space for group discussion and cooperation, including the offer of strong emotional experiences, new competencies are also required of a teacher entering a so-called tutoring role. The teacher becomes more not only a guide, facilitator and advisor, but above all a motivator and moderator of virtual contacts. Rather, he holds the position of “coach” and evaluator of individual work, who also directs the learning process through appropriate communication (Bednaříková, 2013, p. 123). Online education is far from just passing on information in an electronic environment. It is necessary to realize and begin to respect the fact that learning using information and communication technologies is also a social and individual driven process and that there is a big difference between adolescent or adolescent students and adults with rich learning experience (Kopecký, 2006, pp. 80–81). Current challenges for professionals (e.g. Cheng, 2020; cf. Rokos & Vančura, 2020) also correspond to the new priority in online education, where enlightened teachers have increasingly considered pedagogical and andragogical approaches to the learner’s personality in recent years. Characterized the limits associated with the use of information technology and the Internet in teaching in a pandemic situation. This is related, among other things, to the calls of the cited authors to assess and possible changes in both the teacher’s personal concept of teaching and the different learning styles of students.

Researchers’ current interest in orienting pedagogical and andragogical surveys towards gaining serious arguments in support of desirable changes in teachers’ attitudes and opinions in favor of improving the quality of online education has become even more important in times of coronavirus uncertainty (e.g. Mašek, 2020). Reasons for changes, when, for example, teachers take on a coaching role and gradually start to apply a new approach to their own teaching, are also supported by the results of research carried out at universities during the second lockdown. It was then that many teachers began to realize that a pandemic posed a serious threat to the quality of teaching, but at the same time this situation brought with it certain opportunities and benefits. At the end of 2020 (i.e. after two semesters of distance learning), researchers from the Masaryk University Counseling Center in Brno published the results of the survey, which in the opinion of university teachers include the lack of personal contact and interaction with students and the loss of the study regime. and the difficult substitutability of some teaching activities. The respondents of the research saw the positive fact that students, due to social isolation and the absence of distraction, can concentrate intensively on learning, while they have a sufficient

number of electronic resources at their disposal (MUNI Reports, 2020). Another related finding that most Czech pupils and students lacked contact with the school during their online studies and also that they clearly lacked a direct explanation of the teacher (51%) was provided in April last year by a survey of the company (Education.cz., 2020). According to researchers from this company, in which the Czech Secondary School Union and the Futurum Secondary Pedagogical School also participated, pupils and students lacked an explanation mainly because it is more difficult to remember or understand the material without it. The most common disadvantages included the addressed students not only misunderstanding of the subject matter or the assigned task (28.3%), but also the inability to ask questions directly and the lack of feedback (22.7%). On the other hand, students considered the introduction of online teaching a certain advantage in the wider use of modern technologies, which brought an individual approach to education and expanded the possibilities of consultations (Education.cz., 2020).

3.2.3 Methodology

Only recently published results of satisfaction surveys have contributed to the reasons for starting observations of participants in the educational process with an emphasis on detailed research of how CTU students respond to selected methods of pedagogical communication in order to identify their preferences with regard to learning motivation. with online learning. The first major impetus to begin preparations for research was an article published in August 2020 by researchers at Palacký University in Olomouc, in which they shared findings from collaborating on research on the feelings experienced by university students during a pandemic. Although it was a large international survey of the University of Antwerp COVID-19 International Student Well-being Study, seven Czech universities were also involved (Olomoucká drbna, 2020). Among other things, this survey showed that Czech university students evaluated the spring semester and the associated transition to online teaching as a stressful period, which the teachers facilitated with a supportive approach. At the same time, most of them decided that online teaching could not fully replace physical education. One third of Czech students then showed symptoms of depression. The study load increased significantly for 59 percent of bachelor's students; the average number of self-study hours increased from 13 hours to 23 hours per week. The described international research also revealed other interesting findings, which pointed to a similarly high level of stress stemming from uncertainty among students across different countries. Belgian students even pointed to a decline in the quality of education during a pandemic (Olomoucká drbna, 2020).

Based on a lively discussion of the available results of these surveys, which took place in our close research team, and based on the newly acquired experience of teaching with MS Teams (implemented at most Czech universities in coronavirus pandemic measures), we decided to take the first steps. to verify what is good in the non-school sphere, where coaching as an individualized means of professional and personal growth is already commonly used today. We were interested in what principles of the coach's work can be applied in university practice, what are the advantages of such an approach? We also wanted to find out to what extent it is possible to agree with the well-known statement that when planning specific steps in teaching, the teacher's use of coaching skills increases students' motivation and transfers responsibility for results to them – does it help „teach differently“? In addition, a few months later, our belief in the importance of finding ways to improve online teaching through effective communication styles found new support in the results of an empirical survey by the Academy of Sciences and the Faculty of Social Sciences at Charles University to find out how college students deal with school closures. A survey published on the Internet in November last year concluded, among other things, that the amount of time that university students spent on self-study increased by an average of 7.8 hours. It turned out that the situation in which the students found themselves from day to day led to an increase in stress (Poláková, 2020).

The presented findings of the researchers thus confirmed our experience, during which we repeatedly learned from students during the reflective interviews that, thanks to the ordered distance learning, many of them solved considerable communication problems. As the responsibility for the successful transfer of teaching to online platforms was transferred mainly to the teachers themselves, in addition to an unprecedented period (for example at Prague universities for three semesters), it was not always possible to create conditions for smooth pedagogical communication, which, among other factors, depended mainly on the psychological atmosphere in the lesson caused by the teacher's procedure. The key question we began to ask ourselves as teachers and researchers in this context was to examine how to present the original projected form of education to students in an online environment so that they could internally use it and start using it independently. How to translate pedagogical tasks into a set of communication tasks so that students are motivated to take responsibility for their learning and at the same time so that their level of stress does not increase? In an effort to design an effective solution, we decided to bet on the targeted introduction of a coaching approach to our own teaching. Because in general, stress levels are highest among first- and third-year university students, and there is evidence that depression and anxiety scores increase with students' age (Shamsuddin et al., 2013), then our goal was to change the style of online teaching in subjects taught in the last semester of the bachelor's study, including

the inclusion of alternative changes in selected learning situations in which emphasis was placed on the use of sophisticated coaching skills. A total of 21 third-year bachelor's students from two different study programs (Economics and Management and Specialization in Pedagogy) took part in the interviews carried out within the research, when we found out satisfaction with new forms of teaching. The total number of those who were taught in subjects that included improving changes in the survey and became the target group was 63 students (51 women and 12 men).

In addition, the chosen qualitative empirical research strategy found support in the literature from the very beginning. On a theoretical level, the issue of an individual's motivation for education is relatively clear (e.g. Vačínová, 2011 or Šauerová, 2012), but experience-based research is relatively unique in this area. Motivational factors of adults in formal and non-formal education are addressed in the Czech professional environment by only a few authors from the pedagogical or andragogical scientific field (cf. Průcha, 2014; Rabušicová & Rabušic, 2008).

3.2.3.1 The description of the steps taken in carrying out the survey

The description of the steps taken in carrying out the survey can be divided into two phases:

The first phase - a survey aimed at mapping the example of reflective steps of teachers 'tandem with regard to the possibility of evaluating the quality of their own teaching and assessing students' motivation to learn:

- **Step one:** implementation of self-teaching in an online environment conducted with the aim of gradually introducing a coaching style and deliberate use of coaching skills and techniques; making video recordings of online teaching and their subsequent focused observation - teaching reflection and self-reflection; note-taking and teaching. comments, the emergence of ped. summaries,
- **Step two:** creating in-depth analyzes of selected teaching situations, in which the emphasis was on supporting students to learn, subsequent assessment of their quality in terms of didactics and mutual sharing of conclusions in the teaching tandem (discussion within a close professional community),
- **Step three:** creation of new alternative proposals in order to improve self-teaching in the online environment; subsequent verification of new forms of teaching. situations in practice, in the implementation of which both the coaching skills and the new coach were used by the teacher. techniques, including an attempt to assess the impact of changes on student activation in lectures.

The second phase – a survey aimed at determining students’ satisfaction with new forms of teaching and the introduction of a coaching approach:

- **Step four:** data collection in the form of semi-structured interviews conducted with students, which were focused on the evaluation of current teaching through MS Teams, especially finding out the preferences of teaching style and critical assessment of the use of new combinations of activation teaching methods and coaching techniques. The interviews also provided special space for questions aimed at verifying the impact of activities aimed at supporting students’ motivation and achieving learning objectives,
- **Step five:** evaluation of educational effectiveness – verification of students’ satisfaction with the new learning style (implementation of a moderated interview using focus groups with 8 students from the original 21-member group) and comparison of findings with the results of observing changes in attitudes. At the end of the survey, there was an overall evaluation of the research and a discussion of the results in our teaching (research) tandem.

In this case, action research can be understood as one of the forms of professional development of teachers (cf. Janík et al., 2011, Tomešková, 2015), which can serve to bridge the gap between research and theory on the one hand and university practice on the other (cf. Slavík et al., 2020, Greger et al., 2020). In addition, the educational needs of students, who also have great potential to become one of the important stimuli for the development of university didactics, deserve special attention from teachers, especially in view of the recent coronavirus crisis. In connection with the transfer of teaching to the online environment, pedagogical and andragogical questions concerning the quality of teaching arose all the more, e.g. what is the quality of higher education, how to ensure it and how to evaluate it (Roskovec & Beseda, 2009), suitable forms and methods of teaching, evaluation processes, etc. (Kasíková, 2016).

3.2.4 Results

We divided the main research findings into two groups with regard to the individual phases of the survey.

3.2.4.1 Findings of the first phase of the survey

In the first phase of the survey, as teachers in the role of researchers, we aimed to obtain answers to four research questions based on the findings arising from the reflection of our own teaching and self-reflection.

VO1: What do university students need to increase their motivation to apply an in-depth learning style when teaching is fully transferred to the online environment in the long run?

In finding the answer to the first research question, we decided to stick to Průcha's statement that the learning processes and motivation of the student should be the basic starting point for thinking about the teaching process (2018). Given that this theory can certainly be used in the field of adult education, then at the very beginning of the survey we spent a relatively long time focused on observing our own teaching from records taken during online education through the MS Teams platform. This allowed us, among other things, to analyze teaching in detail, while paying attention, for example, to students' reactions to tasks, when the teacher already assumed that the students were sufficiently motivated to learn. The "hard" transition to distance learning and its long duration have often distracted university students. Even more and more often, thanks to being connected from home, it is as if even the best individuals lose their "drive" and desire to experience success. The analysis of the records showed that we had the best results as teachers, especially in those teaching situations where we were able to respond quickly to the passivity of students and when we tried to find out why they avoid active participation in teaching and we communicated with them on whether and how they perform the assigned tasks. It also usually paid off for us to turn to them directly for advice, which would help them feel better in learning and focus fully on the teaching process. Other key findings include the relatively high success rate of steps aimed at continuously building relationships between teacher and students and between students so that they have a sense of belonging. With regard to knowledge in the field of developmental psychology, in the search for ways to streamline online education, we also began to create more space for discussion, where during a reflective conversation consistently included in teaching, it was possible to repeatedly bring individuals and study groups to realize the motives and goals of education. Universities, including the sharing of practical examples and the presentation of the importance of the use of knowledge in future professions. Last but not least, the observation of the records also revealed interesting findings about more or less successful teaching attempts aimed at better specification of goals, as well as clearly clear efforts to include an effective teaching strategy (especially at the beginning and end of the lecture), including providing feedback on goals. Only a few months after the transfer of higher education only to the online environment, we realized, based on our own experience and also thanks to teaching analyzes, how important it is that both participants in the process of pedagogical communication are also its co-creators. If the relationship between the student and the teacher is strong and friendly, then the student seeks the opportunity to talk in situations where circumstances do not require it. In addition, this really increases his motivation to apply an in-depth learning style.

VO2: What steps need to be taken to adapt educational content from “full-time” to a form that meets the requirements of online learning with an emphasis on addressing the negative effects of the crisis on students’ perceptions, understanding and thinking?

Recognizing that in the full-time form of education we commonly use teaching methods that meet the current requirements for higher education and active learning of students (e.g. Zormanová, 2017, Vašutová, 2002) and at the same time with regard to new experience that it is not possible to include in online education the same amount, we decided last academic year to make the following changes: a) slightly reduce the curriculum and rather “insert” several cognitively demanding tasks into the interpretation, which will be incorporated in such a way as to activate the students; b) better visualize the curriculum (preparation of the second more visually appealing version of the PowerPoint presentation); c) respect the attention curve (preparation of a “standby” set of activities based on the application of activation methods); (d) to make proposals for new forms of teaching that provide more opportunities for the development of dialogue teaching and also to provide a safe space for open-ended questions; e) purposefully use coaching style, skills and techniques in teaching. The implementation of these steps into everyday practice was only the beginning of a change in teaching management, the aim of which was to emphasize the activity of individuals and study groups. The attention we began to pay to students in order to improve the perception, understanding and development of their thinking was carried in the spirit of the coaching philosophy. Our top priority was to change students’ attitudes, which can, among other things, bring better creative thinking and use of their own skills and resources, greater flexibility and adaptability to change (here, in particular, to the challenging transition to a crisis period). The content of notes and didactic comments from the observations and the results of in-depth analyzes of selected teaching situations confirmed that the positive approach to study and success in solving assigned tasks and active cooperation in teaching during the pandemic affected mainly how students perceived their studies, field and especially your future.

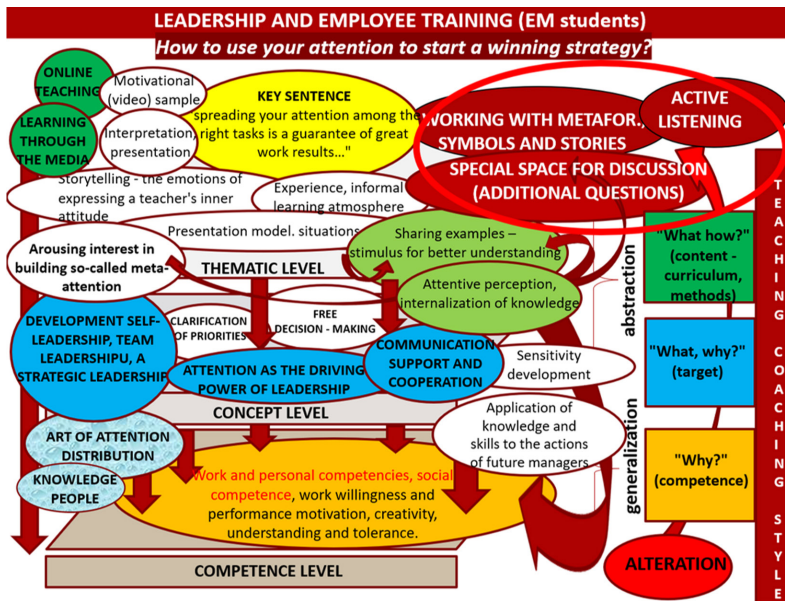
VO3: What alterations taking into account the education of students in the online environment, in the creation and implementation of which emphasis is placed on ensuring a suitable communication climate, can really help to improve the quality of teaching from a didactic point of view to meet the pedagogical requirements for implementing stimulating or developing learning situations?

In-depth analyzes of five monitored teaching situations corresponding to originally only failing or underdeveloped quality levels (Slavík et al., 2020,

pp. 112–113) showed that in addition to excessive teacher communication and insufficient connection of the task with practice, insufficient motivation of students to present their own solutions contributed to also partial mutual understanding and understanding of the educational content. The fact that some of these situations required further development was also confirmed by the newly created tasks concept diagrams (see Figures 10, 11 and 12):

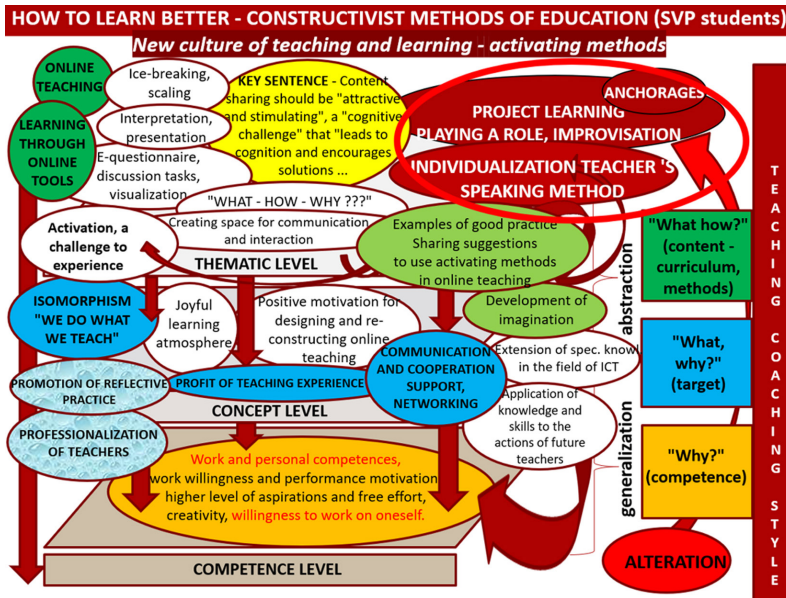
Figure 10

Conceptual structure diagram 1



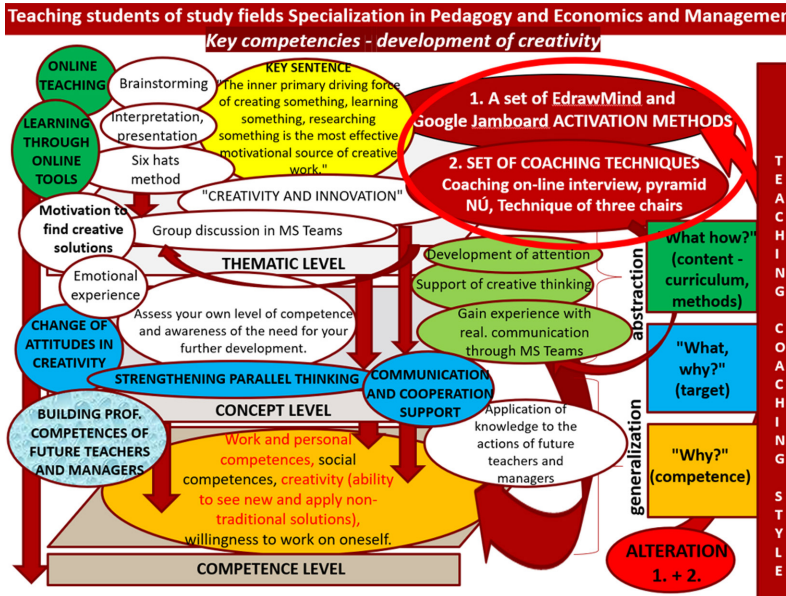
Source: Authors' own work

Figure 11
Conceptual structure diagram 2



Source: Authors' own work

Figure 12
Conceptual structure diagram 3



Source: Authors' own work

Based on the requirement to improve interaction and communication dynamics, alterations were proposed with an emphasis on the student becoming a partner and having real freedom of choice. According to experts in the pedagogical field of science, the individual should understand the educational content so that they can actively create it themselves and communicate about it in a critical dialogue (e.g. Slavík et al., 2017, p. 131).

Reasons for creating the first alteration and outline its form

In an in-depth analysis of the first learning situation presented, we found that during a Leadership and Staff Training lecture, even an experienced teacher can forget to respect the lesson – that just as important as the first impression is, what remains in the students after the lesson. The teaching situation, where the teacher made a special effort to convey a lot of expanding knowledge on the topic, required a change in addition, because the communication of information did not pay enough attention or the transfer of emotions. During the reflection of the teaching, one of the first questions arose “how to amplify the impact of key passages of the interpretation with regard to arousing students’ interest in building so-called meta-attention and developing communication on the topic among students. Based on the results of an in-depth analysis of the observed learning situation and its context, an alternative proposal was created to include a special space for asking additional questions by students and to open a joint discussion. After practical verification of the effectiveness of the proposal in a parallel study group, the alteration of the teaching situation “How to use your attention to start a winning strategy?” Could be considered successful. In retrospect, the new form of the lecture, we found that, in the end, it was not so difficult for us to make the first change, i.e. to re-construct the teaching so that we could investigate more time for discussion. We reduced the content of the explanation in such a way that we so-called transformed part of the expanding information into a separate textual material, which we stored in the study LMS Moodle (shared with students via a link with a recommendation for self-study). In addition to the creation of the described material, there were also minor modifications to the PowerPoint presentation. In return, the implementation of the second change in teaching was a much bigger pedagogical challenge for us. It was not easy to try to convince students of a real, credible seriousness aimed at a very specific goal. Knowing that seriousness is not a cause in body language, but a pure effect, it was a relatively big challenge with regard to the implementation of teaching in the online environment. In addition to trying to make improvements in the level of speech (intentional use of a fixed voice, clearer speech, declining tone at the end of a sentence or addressing individual students by name, especially during a discussion), we also tried to sit upright in front of the screen. positive facial expressions and maintain eye contact. The described

changes aimed at the implementation of successful communication with a strong positive emotional charge, which we tried at the level of verbal and nonverbal communication, eventually brought us teachers a number of good feelings. In addition, a non-violent opening of the way to the development of active listening was a secondary but no less useful consequence of the realized alteration.

Reasons for creating the second alteration and outline its form

Thanks to a detailed analysis of the second presented teaching situation, which was implemented in online teaching for students of combined study Specialization in Pedagogy, we confirmed the opinion of communication experts that when talking to students via PC similar to a telephone interview “depends on 88% how we speak and only 12% of the content, i.e. what we say” (Vogel, 2010, p. 98). Reflective reflection on how to more effectively activate students and motivate them to fulfill the assigned interactive tasks in the subject How to teach better – constructivist methods of education, gradually grew into a deeper pedagogical interest in ensuring how to engage them and inspire them to take an interest in “experiencing” teaching which they can then even better imagine. The original teaching situation, which was evaluated on the basis of the results of didactic analysis as insufficiently activating and at the same time less supportive of students’ experience, was supplemented by a set of learning tasks based on the modification of teamwork into a project task. In order to prevent training from being a mere imitation of the project, the situation was further expanded during the implementation of the new form of teaching by another task using the principles of drama education. Thanks to the introduction of alterations in the monitored teaching, our students in the role of future teachers were able to better understand the activation methods, some together with others (including close cooperation with the teacher) and try themselves, and therefore they could also better accept them in their teaching concept and practice. Moreover, in this context, the teacher’s effort to lead by example and lead pedagogically oriented students to responsible professionalism in the sense of applying the principle of isomorphism became even more important (Tomková, 2015). The realization of our first pedagogical attempts to introduce coaching techniques (here the so-called anchoring and coaching style in teaching) also contributed to the real fulfillment of this principle. Already during the next lecture, when we tested the impact of the change on the quality of teaching, we found that taking different types of breaks during lectures and in communication and interaction with students can be an effective teaching tool in developing deeper thinking, and also to serve well to awaken emotions as primary triggers to evoke the motivation to “become a good teacher”, which is also closely related to the possibility of strengthening the willingness to work on oneself.

Reasons for creating the third alteration and outline its form

The primary reason for the third alteration was when we realized that a reflective approach in vocational education is especially useful in those professions that, in addition to the necessary knowledge and skills, also require creativity or flexibility in decision-making, which is typical not only for teachers but also for example, for managers. There are many common topics in the training of future teachers and managers. One of the issues that is often addressed in the teaching of students in the field of Specialization in Pedagogy, but also repeatedly appears in the content of lectures for students in the field of Economics and Management, is the issue of key competencies. In addition, the lectures specifically devoted to the development of creativity as a key skill of a leader (whether related to the training of teachers or managers), which we chose with regard to our interest in evaluating teaching within reflection, had their specifics. This allowed for a “double” distinction and comparison between better and worse quality of the reflected moments. In the analysis of key learning situations, we found that a change that ensures an increase in quality to a developed level requires teaching for both groups of students. Already during the creation of the concept diagram, we began to play with the bold idea that, given the topic discussed, it would probably be best if the students themselves could largely take responsibility for teaching within the lesson. The idea, which we soon communicated to the students, quickly met with a positive response from the majority. Some students even realized that this would give them a unique opportunity to look at the topic from a different perspective and address it in new contexts. After the initial brainstorming, a number of proposals for new forms of teaching situations were discussed with the students. Subsequently, in the lively discussion (taking place across individual professional communities), two alterations were always selected, which were then incorporated into the preparation of teaching and practically verified. The first group – future teachers – came up with a well-thought-out set of activation tasks, which built on the effective use of online tools, especially to support brainstorming and visualization of the solution process (EdrawMind and Google Jamboard). The second group – future managers – then came up with a proposal for the application of a set of coaching techniques (coaching interview, pyramids and three-chair techniques), which was created on the basis of a judicious choice of the group. In addition, when selecting specific techniques, some students correctly took into account the demands related to the requirement to implement teaching in online platforms. In the case of this last described alteration, it is also worth noting that an integral part of our students’ design has become the training of focused attention, which is still often neglected in educational practice (not only at universities) by teachers and which can be particularly large benefits for both groups of participants in pedagogical communication. Subsequent analysis and assessment of new

forms of online lectures within the practical verification confirmed that both are motivating for university students with a positive impact on quality. The last altered form of the reflected learning situation even meets the requirements for the highest, i.e. developing level of quality, because it also has a consequence for the connection between the development of key competencies and the acquisition of knowledge. In addition to teachers working at Czech Technical University in Prague, Masaryk Institute of Advanced Studies, this survey result may please other university pedagogues, for example in connection with the description of the starting points of key competencies of education managers, which can be found both in general models of managerial competencies and in competency standards of pedagogical staff.

VO4: What specifically can be seen the benefits of using a coaching approach with regard to the need to reduce stress in long-term online teaching?

The coaching approach generally represents a new type of attitude towards people, towards their leadership and management, but also a relationship with oneself. Experts (e.g. Whitmore, 2005) the coaching approach is characterized as a transition from coercion to choice, ev. support of human ability to control oneself. In coaching-style instruction, there is no longer room to use commands, control, influence, or persuasion. As a result, a teacher who decides to internalize the coaching approach and begins to treat students in the sense of emphasizing their needs has a greater chance of improving the overall quality of pedagogical communication.

Based on our own experience gained in the new broader teaching role, we see the advantage of using a coaching approach mainly in the fact that if students manage to establish a relationship at the partner level, then it is much easier to support, encourage and motivate them. Thanks to this change, most students will be led not only to find different perspectives on the issues addressed, but also to accept their own responsibility for fulfilling their study obligations. From a didactic point of view, it can be considered particularly valuable that we have repeatedly made a positive experience with the practice of coaching style and the targeted use of coaching skills during the implementation of teaching in the online environment. During the survey, we even observed a growing interest in the use of internal resources by several students to ensure a suitable communication climate, which can be considered an effective way to help students cope with the stress of long-term long-distance communication. The testimonials of students, which were heard during the discussion in the recorded reflective interviews conducted at the time of the final online lectures in this summer semester, also provided valuable evidence of the closer relationship of several students with both the teacher and other members of the study group. These

students also talked about feelings of greater belonging within the study group. It is also worth noting that thanks to changes in teaching, we also managed to activate a group of students consisting of participants in the intensive Employee Selection Procedure course for above-standard study performance. Specifically, these were students of the 3rd year of the Bachelor's degree program in Economics and Management, who completed our leadership lectures in the last year of study and who were also given special facilitation attention during this online course. According to our original plan, the main goal of the course was to enrich students' competencies in people management with an emphasis on gaining practical experience in human resources and social development, but in the final reflective interview several students praised the coaching style – they see a positive change in terms of better management of isolation” and “that they have an increased desire to use their abilities and get to know more”. These testimonials show that the newly introduced leadership style – albeit in online teaching – is also one of the appropriate ways for a teacher to really support students in overcoming stressful situations.

3.2.4.2 Findings of the second phase of the investigation

In the second phase of the survey, based on interviews with students, we aimed to obtain answers to the following three research questions:

VO5: What is the response of students to changes in the form of teaching situations that we as teachers can make in order to minimize the problems associated with the transition to teaching through MS Teams - with regard to student satisfaction and motivation to learn?

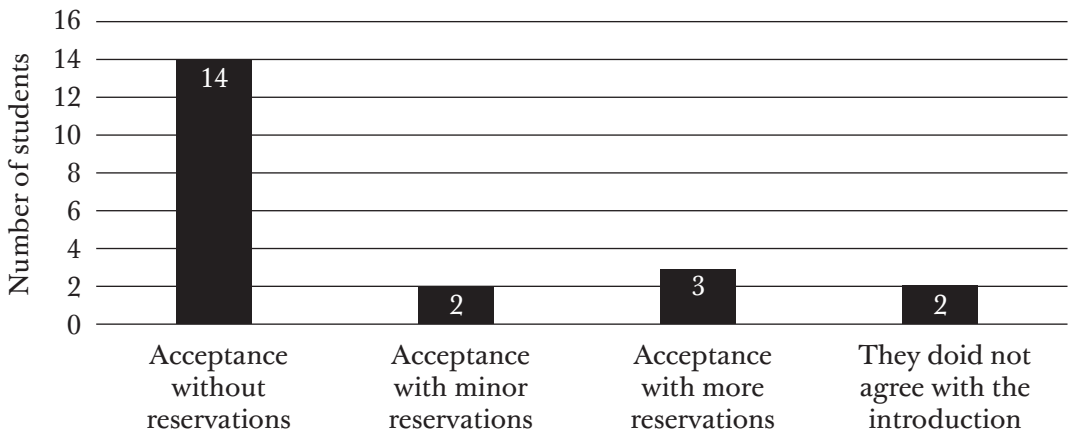
Before we started asking our students about their opinion on the new form of teaching, we were interested in which form of education generally suits students better. From the various answers we received from the students, it was not possible to interpret it unambiguously. In the retrospective evaluation of teaching that students experienced during their bachelor's studies at MÚVS ČVUT, the majority (66.66%) praised the classic contact form. The main reason for this choice was daily direct contact with classmates. Other reasons why they preferred regular school meetings were “better understanding of the subject matter”, “the opportunity to ask questions to the teacher and take advantage of opportunities for interaction and communication”, the implementation of which required a natural way of working together in a group to carry out assigned tasks. Exactly one third of the students justified their preference, especially with regard to their own experience, “that they will better retain attention when interpreting at school”; two of them even spoke directly about the need for order in learning and the need to “be in the classroom”. At the same time, more than

half of the students surveyed acknowledged the benefits associated with distance learning, mostly in terms of saving time (“no need to commute”, “I can sleep longer in the morning”); others appreciated “that I could post a recording of the lessons” or “that they are more comfortable learning at home”. It is also worth noting the statement of several students (6) who answered this question in a similar way – that “they needed to distinguish whether we are interested in their preferences when choosing a form only for lectures or also in the case of organizing exercises. To the supplementary question, everyone answered that they consider the exercises carried out in the online platform to be more or less unnecessary. The vast majority of interviewed students (85, i.e. 71%) at a time when (not only) our school had long-term education only through teaching in MS Teams, also noticed the attempts of teachers to minimize the disadvantages of distance learning and acknowledged them, whether they were more or less successful. A very exceptional response from students was noted by the strong interest of some teachers in establishing good relationships with students and between students.

Of all the steps we have taken in favor of change “for the better” in our lessons, the students highlighted in particular the numerous pedagogical efforts to create a friendly atmosphere in lectures and also to ensure a safe space for more open communication. In the reflective interview, one of our students also talked widely about “how great she felt when she had more space to communicate with other classmates and at the same time enough space to express herself”. Another student appreciated the fact that thanks to the changes, a number of practical tasks were added to the lessons in the online environment, which were not only interesting from his point of view, but which also “forced him to concentrate more and think about the right solution”. As shown in Graph 13, more than 2/3 of the students surveyed (16) experienced a gradual change in approach, with a positive acceptance of 66.66%. Two students in the group had minor reservations about how to manage those learning situations which, in their opinion, required “rather classical assignments and invocations”; in this context, there was also a complaint about the teacher’s tolerance “for too loose presentation of students’ opinions” on the topics discussed. The introduction of coaching style, skills and techniques into online teaching was accepted by 14 students without reservation; with minor reservations 2 and with major reservations 3 students. Two addressed students within the survey did not agree with the introduction of the “new” style.

Graph 13

Introduction of coaching style, skills and techniques into online teaching

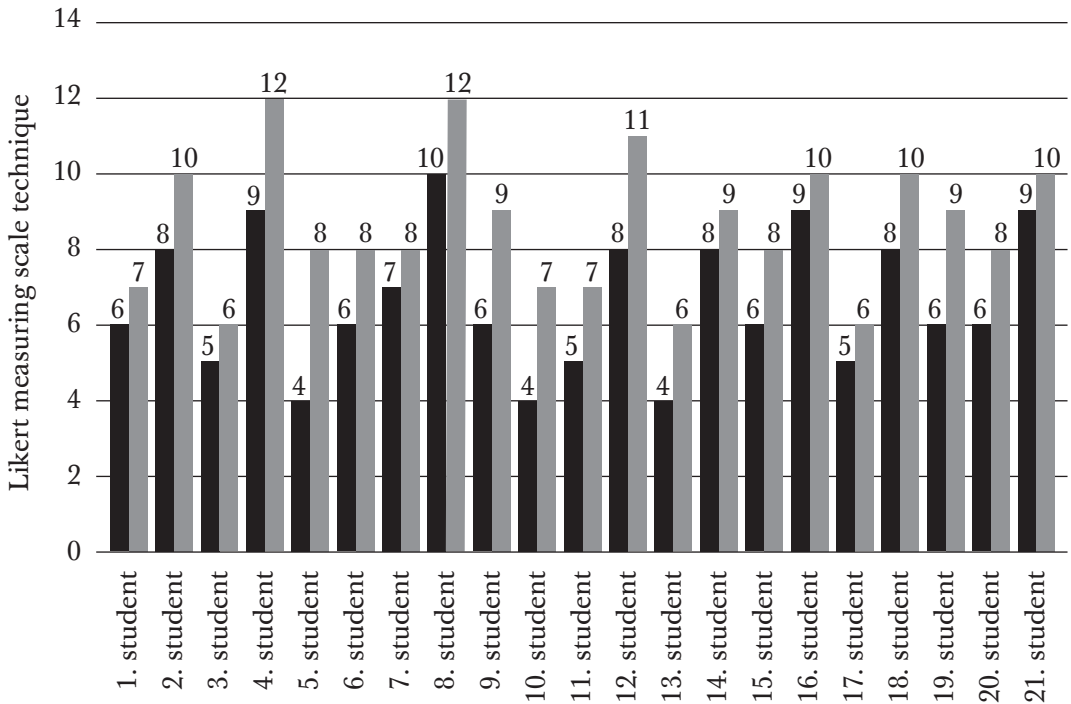


Source: Authors' own work

On the other hand, it was the possibility of choosing a solution, enough time to think and the teacher's support in sharing their own ideas, which many students commented on in retrospect, saying that „such teaching is much more fun and motivating”. Most students in new forms of online teaching were interested in including examples from practice, presenting strong emotional stories and creating opportunities for possible experiences. As Graph 14 suggests, the level of intrinsic motivation to learn during online teaching was determined using Likert's measuring scale technique (1-12). Based on the findings of the presented survey, we can state that after the introduction of changes in teaching combined with the application of a coaching approach, the internal motivation of our students increased by an average of two points!

Graph 14

Internal motivation to study



Black = original inner motivation. Gray = change in internal motivation

Source: Authors' own work

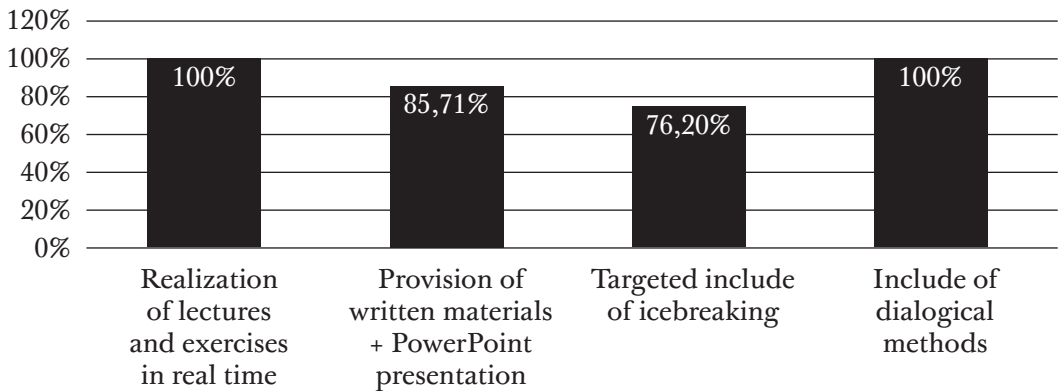
VO6: What activation methods and coaching techniques do students rate as the most successful in teaching with regard to increasing interest in communication and interaction.

Graph 15 illustrates that interviews conducted with students in the survey also showed that they were very comfortable with online lectures and exercises, which took place in real time (according to the schedule) 100% (21 of 21). The vast majority of students (18 out of 21, i.e. 85.71%) acknowledged the written materials provided, including PowerPoint presentations, which, in addition to text, links and a relatively large number of pictures, also contained a number of open-ended questions that can be used to activate students. Several students also liked (especially for more complex questions) the incorporation of the help directly into the individual slides, and they also appreciated its funny form (rotated text using a small font size, which did not interfere with reading the core content). The highest level of agreement on the Likert scale was expressed (16 out of 21, i.e. 76.2%) by students with targeted inclusion of various types of ice breaking in teaching; they praised the intentional introduction of the so-

called introductory or entertaining icebreakers the most, they also positively evaluated the organization of short team games focused on team formation and the development of cooperation. All students also agreed with the intentional inclusion of dialogical methods in lectures 100% (21 of 21) when retrospectively assessing changes in teaching.

Graph 15

What suits students

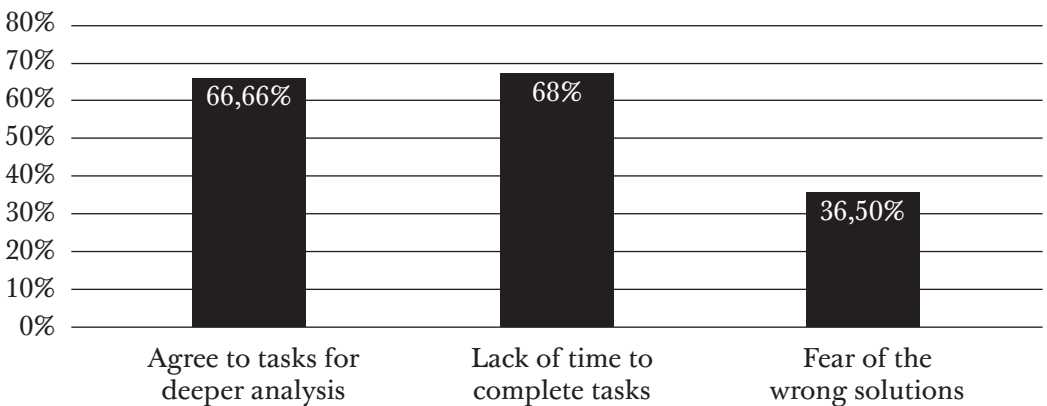


Source: Authors' own work

As seen in Graph 16, more than half of our students (66.66%) agreed with the assignment of voluntary homework, the aim of which was to expand knowledge and inspiration to think more deeply about the topic. In the survey, we also found that the biggest barrier in developing these tasks was considered by these students mainly lack of time (68%) and fear of incorrect solutions (36.5%).

Graph 16

Assigning voluntary homework



Source: Authors' own work

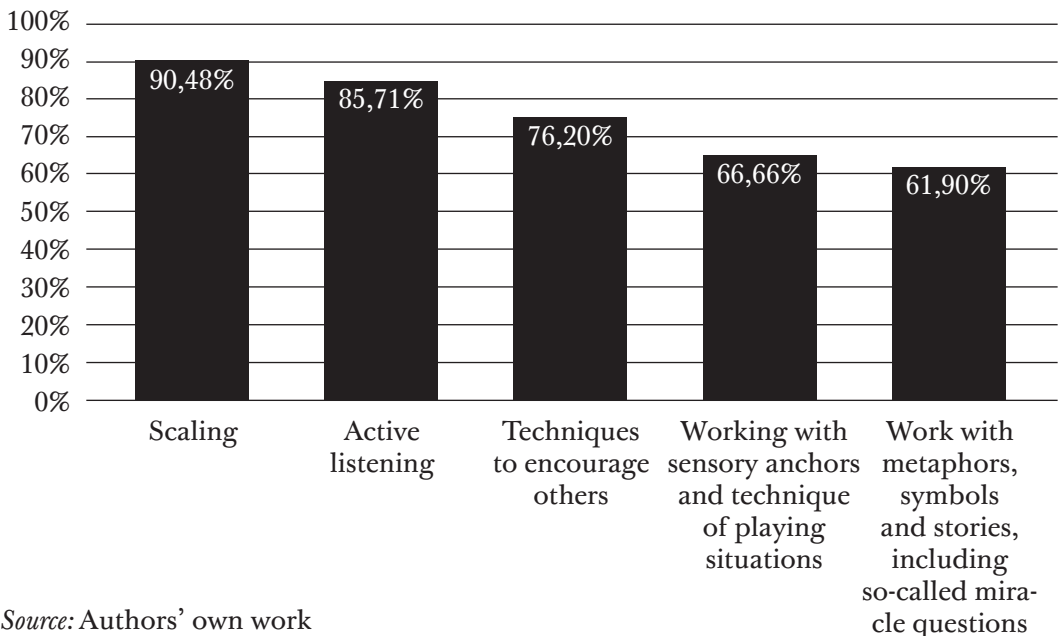
With regard to the activation impact, most students rated the use of the following coaching techniques (useful in frequency from the one they found most useful and most satisfied with):

- scaling (19 out of 21, i.e. 90,48%),
- active listening (18 out of 21, 85,71%),
- techniques to encourage others (16 out of 21; i.e. 76,2%),
- work with sensory anchors and situation replay technique (14 out of 21, i.e. 66,66%),
- work with metaphors, symbols and stories, incl. including the so-called miracle questions (13 of 21; 61,9%, as shown in Graph 17).

Most students also received special attention in those forms of teaching where metaphors, symbols and stories were worked on in a targeted manner, and where teachers included so-called miracle questions in their teaching. It is a modern technique based on the Shazer approach (2007), the use of which can be seen today in many areas, including therapies (e.g. Kratochvíl, 2012), and yet students encounter it only rarely in university teaching. In addition, most students are well aware that the conversation following the so-called miracle question must be conducted in an appropriate form in order to remain in the imagination for a while and „enjoy it“.

Graph 17

Use of coaching techniques



Source: Authors' own work

Another finding from the survey is that when describing new forms of teaching, the described issue by students was one of the most common triggers, when they began to become aware of the work of the teacher with voice, especially his intentional use of a certain tone or thoughtful emphasis on key knowledge and creating related speech breaks. The students responded best to the vote of a “friend” (the degree of agreement on the Likert scale was confirmed by most of them with a value of 9 to 10 out of 12) and to the voice of a “wise old man /wise elder” (7 to 8 out of 12). With the change in the way of speaking, at least some students (9) also noticed an increase in pedagogical efforts for cooperation. Related to this was the emergence of a good feeling from the overall good impression of some teachers, which these receptive students considered a helpful expression of the relationship and a signal to start the desired communication. In retrospective interviews, students most often assessed the influence of teachers’ facial expressions on the development of a friendly atmosphere in teaching, evaluating those who kept the camera on throughout the online lecture or exercise, and their facial expressions mainly reflected positive emotions (including smiles). All our students, whom we interviewed, then unanimously agreed that “in such a case they wanted to take part in the interview, answer questions and actively participate in activities related to finding the right solutions”.

VO7: What changes in attitudes to education do students experience as a result of attending a teacher-led teaching?

Because coaching - as such - is always associated with change, even in teaching in a university environment, this also means that students also have to come up with their own solutions and approach. The majority of interviewed students (76.2%) praised the changes in the form of teaching related to the introduction of coaching style in lectures and exercises. During the discussion in the group in-depth interview, some students (8) commented more specifically in favor of our survey. In an effort to better describe the benefits of the coaching style of teaching, these students have named a number of principles which, like their teachers, they have believed and which they have since tried to embrace and embrace. They most often agreed with the following statements: “every problem has a solution”; “If one person can do something, others can do it”; “If we want to understand something and understand it, we have to do it”; “We have all the resources we can ever need”; “There is no failure, there is only feedback that is irreplaceable on the way forward”. In the in-depth interview, several students expressed a more or less similar view to the fact that when implementing the coaching approach, they also realized the connection with the need to develop communication and interaction in lectures. They welcomed the “friendly atmosphere in teaching” the most. In connection with this, they also emphasized the importance of some implemented learning situations “where they were asked questions that were supposed to move

them in their thinking”, “where they could gain a new perspective and decide for themselves how to do it”. They also said that as future teachers or managers, they “enjoyed mainly activities using coaching techniques, which they are more or less convinced will eventually use them in their profession”. None of the students spoke directly about the change in attitudes, but two students in Economics and Management commented on this issue as follows: the first admitted “that, thanks to the changes in leadership classes, she realized what could affect her most – her own attitude to others’; the second student added to her classmate’s statement, “that in recent months she has tried to focus much more on what she can influence herself and less to worry about what doesn’t work”. During the group discussion, another student – the third – talked specifically about self-reflection and its importance for herself. She reminded other students of several teaching situations, when she received positive feedback from teachers, which not only supported her at the time for further activities, but also motivated her to continue working on herself. Because she was experiencing a difficult situation at the same time at school and in the family, she was able to overcome the crisis and continue her studies. As part of the retrospective reflection of the monitored teaching, two other students also confirmed a similar experience “with increasing self-confidence”, “supporting motivation to learn” and “starting the appetite for tasks”. Another pair of participants in the group interview spoke about the influence of the coaching style on the change in the style of the students, who said, “that they are not tired of looking at each other like in a mirror” and “that it sometimes upsets them from balance”. At the same time, both students responded to the supplementary question of the teacher in the role of moderator rather positively, explaining that the inclusion of coaching techniques in combination with other activation methods in teaching more or less does not bother, because “in such situations they usually no longer experience discomfort” and as a result, it is usually a welcome revival of teaching”. Last but not least, we offer to publish another equally important result of our survey, which is based on the findings of the very conclusion of the “focus”, when the words of several course participants for future HR professionals and managers were heard. Based on their own experience, these students praised the introduction of coaching style in teaching and on that occasion especially appreciated its **positive impact on the formation of work teams, the development of team communication and increasing the motivation of individuals to cooperate in solving tasks.**

3.2.5 Discussion

From the very beginning of considering how best to focus our research, we tried to look at the topic of introducing coaching access to online teaching at universities from a didactic point of view. The research was a welcome opportunity for us not only to verify the impact of targeted use of coaching skills in leading university students as one of the ways to implement the desired changes in current higher education in favor of improving the quality of distance learning, but also to deepen reflection on their own teaching. The implementation of the described research is also a response to the challenges of experts in the field of education (e.g. Nezvalová, 2003, cf. Janík, Janíková, 2009), who consider action research as a tool of systematic reflection and more generally strengthening teaching strategies based on research and experimentation. The presentation of the results of our survey also has a chance to increase teachers' awareness of the benefits of applying a coaching approach and skills in higher education and enrich the hitherto relatively modest knowledge of pedagogical experts on coaching in school practice. Horská, 2019). Thanks to the sharing of one's own experience from university educational reality and the mediation of didactic comments clarifying new forms of educational processes, incl. Last but not least, we also want to strengthen Czech andragogical research, "which is still less developed than it should be" (Průcha, 2014, p. 11).

All the described steps performed in the research tandem within the research were marked by high demands on the wide range of knowledge and skills needed for coaching. With regard to the requirement of pedagogically oriented experts to implement proposals for „improving“ changes in education derived from didactically designed teaching analysis (e.g. Slavík et al., 2020; Janík, 2013), in order to meet the goal of applying coaching principles to higher education, transformation of thinking, attitudes and attitudes in leading students, which meant for us teachers a lot of effort, especially in entering a broader concept of the teaching role. Without the change we had to go through ourselves, when the teacher's (as a coach's) faith in the student (as a coachee) and his abilities are absolutely crucial, we would not be able to see the students' problems through their eyes and create space to seek "their" truth. and designing your own solutions. We have tried ourselves that "coaching" teaching for teachers means, above all, realizing that we are only helping our students to think. Subsequently, we found that it was just as important to internalize this idea, which means, among other things, changing our attitudes and actions extensively. The teacher fulfilling the coaching approach in teaching focuses his attention on the process, leads and motivates his pupils or students in a creative way, and together with them he always thinks about how they will benefit from the learned content. Last but not least, we are aware that the presented successful forms of cooperation

with students in “coaching” teaching have positively affected our enthusiasm for work and good evaluation of “teacher self-efficacy”, which are an important factor in motivating students to the subject and their intention to study (Meece, Anderman, Anderman, 2005). Today, we have enough of our own experience to be able to publicly claim that if teachers working not only in the university environment gradually changed their thinking style, put coaching principles into it and acted on them, we would eventually have other – slightly better – education in the Czech Basin. And how to educate in the future? *“Having critical and logical thinking, working together and communicating, being creative and developing creativity, independence and flexibility, as they say, is all about everything – understanding the principles in many areas. It is better to create the future than to adapt”* (Šebek, 2018).

3.2.6 Conclusion

Guided by the above idea, we believe that this chapter, which focused on monitoring the relationship between the application of coaching approach and skills in higher education and increasing students’ motivation to communicate and interact in teaching, will provide stimuli for further research. Although all the findings from the action research survey, which captures the transformation of their own teaching, can be accepted in a variety of ways in the Czech environment, based on their dissemination in the professional field, not only university teachers can be inspired to think and subsequently implement their own steps in favor of supporting the idea of a “teacher as a researcher”, which may result in both an improvement in the quality of one’s own teaching and in the transformation of the curriculum into education (Hui, Grossmann, 2008). In addition, the issue of introducing a coaching approach to online teaching at universities may become a generally desirable trigger for discussion among teachers about the educational reality with an emphasis on the quality of students’ education in the online environment from a didactic point of view or a call for joint university issues so far we meet us only rarely (Kasíková, 2016).

Using the online environment greatly simplifies group collaboration. Teachers and students can record information in projects, calendars and documents from anywhere with the Internet access and keep it up to date on all connected devices. Education involving an online environment significantly increases efficiency in performing common tasks (Svoboda, 2020).

Although the primary goal of the presented survey was to benefit its participants, we believe that by publishing it we will point out the next direction that the following pedagogical research could take. It is a response to the current challenges of the professional and lay public to open a discussion on the weaker

professional aspects of Czech teachers, which include the insufficient ability to motivate their pupils or students in online teaching. The use of every opportunity to think more deeply about one's own online teaching in reflective practice is all the more desirable at a time when we can already rely on evidence that during the COVID-19 pandemic, teachers were not only willing to respond to the challenges posed by the new conditions but also that significant shifts in digital competencies of individual teachers have been registered across our education system (Tomešková, 2020, p. 73).

One way to support teacher development can also be to share examples of good practice - in particular, passing on experience in introducing coaching skills into online teaching with an emphasis on unleashing students' intellectual and emotional freedom of activity. The presented empirical study can give candidates from a wide pedagogical community the courage to critically examine their own actions, and at the same time its results can convince teachers of the benefits of transforming their usual approach into a coaching style of leadership. Looking at the activities of a university pedagogue from a professional pedagogical point of view is more desirable than ever in the current "specialization" period, and therefore it is appropriate to appeal to teachers in every appropriate opportunity to expand communicative competence as one of the competencies for excellent performance in our profession.

"... The gates of teacher wisdom open slowly and cannot be passed through the crack." (Slavík in Slavík, Müllerová, Soukupová, et al., 2020, p. 10).

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3.3

Teacher's competence for problem-based and research-oriented teaching of vocational subjects in the conditions of digital education and connectivism

Pavel Pecina, Peter Marinič

Introduction

The chapter addresses the issue of competencies of vocational education teachers for the preparation, implementation, and evaluation of problem-based and research-oriented teaching. These concepts are changing in the context of digital education and artificial intelligence. It is necessary to find a model allowing the application of constructivist teaching in the conditions of connectivism to education. In the first part, the attention is focused on the theoretical basis of the problem and the current state of knowledge in the field. The next part deals with the competencies of vocational education teachers corresponding to the application of these concepts in the conditions of digital education.

3.3.1 Goals

This chapter focuses on the current approach to the topic of research-oriented teaching and problem-based teaching with emphasis on their characteristics. We emphasize both the difference between the two concepts and the areas in which the concepts intersect in it. As the title of the chapter suggests, we assess the topic in the context of vocational education and define the use of these concepts for teaching in specialized subjects of vocational education. Due to this focus, we also connect research-oriented teaching and problem-based teaching with another concept, which is the STEM concept. We also follow up on the topic of research-oriented and problem-based teaching with the competencies of teachers, especially teachers of specialized subjects in vocational education, which we specify in more detail in the conditions of digital education and connectivism. Finally, we present our own competence framework for research-oriented teaching of teachers in vocational education in the conditions of digital education.

The aim of the chapter is to create this competence framework, which is based on the identified key characteristics of research-oriented teaching in digital education using connectivism and constructivist concept of teaching in accordance with the implementation of the STEM concept in technical vocational education.

3.3.2 Research-oriented and problem-based teaching

Research-oriented teaching is a term that resonates significantly in domestic and foreign sources in recent years. History of research-oriented teaching dates to the second half of the 20th century, when new more effective teaching strategies

were sought. The essence is the discovery and acquisition of new activities that relate to better readiness for professional and private life (Dostál, 2015; Dostál & Kožuchová, 2016; Ross, 2006). However, as pointed out by many authors, if we analyse domestic and foreign studies, *we can find different approaches to the definition of research-oriented teaching*. (Anderson, 2002; Dostál, 2015; Etheredge & Rudnitsky, 2003; Papáček, 2010; Schwartz et al., 2004; and others). The reason is the wide scope of the concept of research-oriented teaching and its connection with other methods and concepts of education, such as problem teaching, heuristic teaching, activating teaching, project teaching, etc. Therefore, research-oriented teaching is not easy to clearly define and characterize. Dostál (2015) points out that this trend can be seen in many domestic and foreign authors.

We observe two different tendencies in the approach to the research-oriented teaching. The first tends to conception of *research-oriented teaching as an analogy of problem-based teaching* (Papáček, 2010). Mentioned author defines research-oriented teaching as one of the effective activating methods of problem-based teaching and comes out from the constructivist approach to teaching. The teacher does not distribute the subject matter in final form only by traditional methods, but also creates knowledge by solving teaching problems. Research-oriented teaching uses a variety of teaching methods, procedures, and strategies. The author further states that the basic characteristics of research-oriented teaching include the following features: pupils ask research-oriented questions, pupils discover evidence, pupils formulate explanations based on evidence, pupils evaluate explanations with the possibility of using alternatives in explanations, and pupils communicate and verify explanations (Papáček, 2010). This approach can be described as a *narrower perception of research-oriented teaching*.

The second approach finds the essence of *research-oriented teaching in wider concept, which includes not only the solution of problem tasks in teaching, but also other learning activities of pupils*. The concept is presented for example by Nezvalová (2006), perceiving it as a concept of teaching in which teaching in the classroom is shaped by pupils themselves and the teacher is a facilitator. In relation to pupils learning, research-oriented teaching is an active process that reflects the approaches of researchers to study and to research in nature and in technology. It includes experience, evidence, experiments, and the construction of knowledge structures. Therefore, it is consistent with a constructivist approach to education (Nezvalová, 2006). This definition can be described as a *broader perception of research-oriented teaching*. This concept is similarly defined by Dostál (2015), who feels needed to distinguish problem-based teaching from research-oriented teaching. Dostál also perceives it as *activity of teacher and student aimed at developing knowledge, skills, and attitudes based on active and relatively independent cognition of reality by pupils. The pupils learn to cognize the reality and to discover it through the activity. Despite the above characteristics, we feel the need*

to differentiate research-oriented teaching from other concepts, especially problem-based teaching (Dostál, 2015, p. 32).

Research-oriented teaching in vocational education can be perceived as one of the higher forms of activating (problem-based) teaching, in which elements of scientific and exploratory research, discovery and construction design are already applied. It is a higher form of active and creative activity, in which pupils discover knowledge and design and construct new solutions within technical learning tasks. It represents the acquisition of knowledge through observation, manipulation with objects, discussion, experimentation, and practical construction design activities. The tasks should be based on real life and guide pupils to search for answers through their own experimentation and research. However, it should be added that research-oriented teaching does not have to include only problem learning tasks. Thus, we tend to a broader perception of research-oriented teaching.

The concept of research can have different scope and level in this context. We find approaches to the research in the following research types (Banchi & Bell, 2008):

- confirmatory research – the question and the procedure are provided to the pupils; the results are known as well; it is a matter of verifying them by own experimentation and practical activities of pupils,
- structured research – the question and the possible procedure are communicated by the teacher; the pupils will formulate an explanation of the relevant phenomenon based on this information,
- guided research – the teacher asks a research question; the pupils choose a methodological procedure and then implement it,
- open research – pupils ask questions, think about the procedure, conduct research, and formulate the results of research.

The abovementioned division of research activities is also found in other authors (Stuchlíková, 2010; Svobodová, 2013; Trna, 2012). Each level of research types reflects the level of pupils' research learning activities. Confirmatory research represents the basic level of research types and open research represents the highest level. Within the application of research-oriented teaching, many variants of teaching activation methods are commonly used (discussion methods, project teaching, group teaching, laboratory work, experimentation, work at training workplaces, workshops, laboratories, etc.). The process and individual phases of research are analogous to the process within problem teaching. In this context, we can add individual elements (components) of the system of research-oriented teaching, which is concisely defined by Dostál (Table 7).

Table 7*Teaching components in research-oriented teaching*

Teaching component	Character in research-oriented teaching
Teaching objectives	Acquisition of knowledge related to the subject of cognition, research methods and attitudes, development of perception and thinking.
Teacher's activity	Teaching with the use of research-based activities, preparation of suitable situations for research.
Pupils' activity	Learning through research activities, discovery.
Educational content	Knowledge gained through research-based activities and acquired research methods, experimentation, measurement, observation, etc.
Teaching methods and concepts used	Method of problem interpretation, heuristic methods, method of explanation, briefing, method of demonstration, discussion method, project method, dramatization, staging methods, didactic games, STEM concepts, etc.
Organizational forms	Group lessons, excursions, frontal lessons, individual lessons, etc.
Material resources	Laboratory aids, experimental kits, construction sets, programmable kits, teaching kits, etc.

Source: Dostál (2015, p. 31), adjusted by authors

The research-oriented teaching is perceived as a system, model, or teaching concept, which integrates all important elements of the didactic system (teaching methods, organizational forms of teaching, material teaching aids, and appropriate teaching environment). The highest levels of research-oriented teaching are assumptions to develop critical thinking, which is perceived as a deliberate application of higher thought processes (analysis, synthesis, comparison, generalization, reasoning, and evaluation). As Hrmo (2016) declares, critical thinking means learning to think; to think about your thinking in such a way that we reveal its strengths and weaknesses and improving our own thinking. It represents the ability to assess quality, benefits, to select the most appropriate solution, evaluate the degree of certainty with which we accept solutions, and create logical judgments. Other authors have similarly defined critical thinking as well (Angelo, 1995; Beyer, 1995).

The research-oriented teaching in the condition of vocational education requires appropriate material equipment (nowadays especially in the form of construction kits, teaching sets, tools, measuring instruments, production resources in the given fields, consumables, and software equipment). During construction activities in teaching, equipment in the form of machines and tools, 3D technology and 3D printing (software, 3D printers, and consumables) is also often required.

The output within the research-oriented teaching of specialized subjects may be:

- for technical subjects: verified connection, product prototype, disclosure of the principle of technical system operation with explanation, disclosure and verification of the relevant phenomenon (process or procedure), etc.,
- for economic subjects and subjects of trade and services: portfolio (economic or production portfolio), prepared and realized event (banquet, themed evening, product exhibition, demonstration of field work, open day, or events for the public), etc.

The research-oriented approach extends problem-based teaching to include research and experimentation with material equipment. It is an analogy of scientific research and development, but at a lower level. It is difficult to reach a comprehensive successful solution to innovative technical assignments at the secondary school level (exceptionally it is possible in the secondary school professional activity). The main importance of the research-oriented teaching is activation of the pupils, development of activity, independence, creativity, socialization, and the development of intellectual and psychomotor skills of the pupils. According to Held et al. (2011), the development of scientific work skills presupposes the development of six skills: the ability to make assumptions, to communicate, to work, to classify, to measure, and to draw conclusions. Pupils are involved in the roles of researchers who formulate hypotheses, reveal principles of action, compare, test, and verify until the task is solved and proven. However, this presupposes primarily the acquisition of general logical procedures (analysis, synthesis, and generalization). This approach has become increasingly preferred in vocational technical education in recent years. It is referred to as *Inquiry-based Science and Technical Education* or as *research-oriented teaching* (Dostál, 2015; Held, 2011).

The projects to support research-oriented teaching were realized as well. The ESTABLISH project is an international project involving eleven European countries, which requires laboratory equipment, but there is an alternative in the form of an interactive demonstration in a virtual environment for institutions that do not have sufficient material equipment (Center, 2022). The aim of experimentally and practically oriented activities is a practical task (practical problem) and finding its solution. The implementation of physical material realisation is a part of the task – the selection of material and the optimal solution of the task is also included.

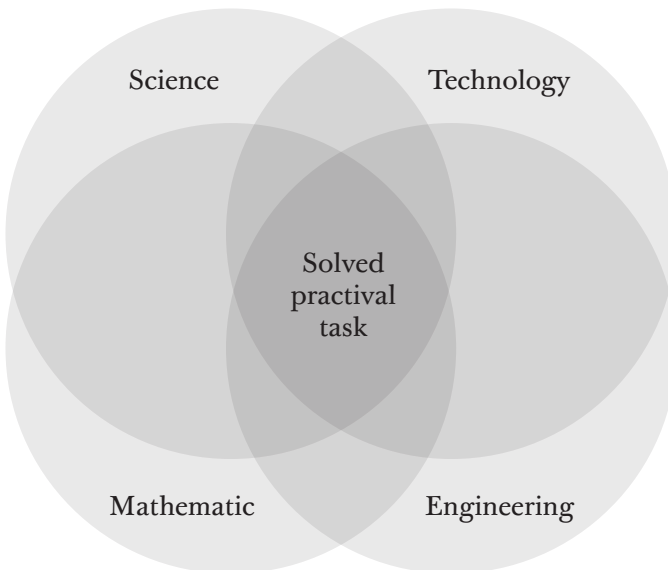
3.3.3 STEM concept

In the following text, we will focus on the *STEM concept*, which is an important area of research-oriented teaching in science education and vocational technical education. The STEM concept originated in the 1990s in the United States as a response to chronic isolation between individual subjects. The abbreviation STEM represents the first letters of the English name of areas implemented in the concept: *Science, Technology, Engineering, and Mathematics*.

The importance and interconnection of the areas was of interest in the United States as early as the 1980s (Education Week magazine). The STEM label was created later and began to spread throughout the United States to train quality science and technology professionals.

The intention of the concept is cross-curricular and interdisciplinary integration and blending of these areas in teaching. The logical and natural proximity of these areas is the starting point for their connection. A lot of attention has been paid to the STEM concept in the last two decades due to importance for the sustainable economic development and for maintaining competitiveness (STEM Concept, National Pedagogical Institute). Part of the teaching is to solve a problem task that has a practical impact. The following diagram shows a graphical representation of the STEM concept (see Figure 13).

Figure 13
STEM concept



Source: <https://www.jeduedu.cz/> (2022)

The STEM concept is currently also being expanded and developed as STEAM concept and STEAMIE concept. *STEAM concept* adds the area of *Arts* (ability to create or present) to the STEM concept. Arts in this sense means not only music art, virtual art, or drama, but also art in technology and industry (such as industrial design). *STEAMIE concept* represents the involvement of inclusion in education (*IE - Include Everyone*), in which everyone can be educated and the idea of equal opportunities in education is implemented.

Teaching according to STEM concept connects theory with practice, brings education closer to real life and replaces the classic concept of teaching in isolated subjects by interconnecting subjects to solve practical problems (JeduEdu.cz, 2022). The special teaching aids that have the STEM symbol on the packaging are used in teaching according to STEM concept, such as LEGO kits, programmable kits, robotic kits, construction kits, which are available on the market today.

We propose the division of these teaching aids into the following groups:

1. Teaching kits, teaching sets and programmable teaching sets
 - mechanical construction kits and sets (e.g., Engino kits),
 - programmable kits and sets (e.g., Arduino kits).
2. Robotic kits (e.g., makeblock, Apitor-Super Bot, ROBOTIS STEM 1).

It is possible to use other teaching kits, sets, and aids for the needs of teaching specialized subjects in accordance with the STEM concept. However, teaching kits, sets, and aids need to be appropriately included in the teaching system in connection with the learning objectives, teaching content and teaching technology for effective use of the STEM concept.

3.3.4 Teacher in vocational education and teacher's competencies for research-oriented and problem-based teaching

The topic of teachers' competencies richly appears in domestic and foreign literature. Among the domestic literature the studies of Švec (1999) and Vašutová (2002) could be mentioned, and from foreign literature the works of Hrmo and Turek (2003), Hrmo et al. (2016), and Korthagen (2004) as well. The study by Dostál (2015) deals with the topic of research-oriented teaching.

The concept of *competence* is not clearly defined in the literature. However, attempts to specify a competent teacher are frequent in the literature. There

are variant terms such as good teacher, effective teacher, respected teacher, ideal teacher, or excellent teacher as equivalents to the term competent teacher (Cruickshank & Haefele, 2001). As Spilková (2010) declares, many professional studies have tried to identify the competencies of a good (quality) teacher based on empirical research. In connection with the models of an effective (quality) school, the models of a quality teacher were also created. This includes the area of knowledge, skills, personal prerequisites, and abilities to perform the activity and their correct application (Spilková, 2010). The requirements for a competent teacher of specialized subjects in preparation, implementation, and evaluation of problem-based teaching and research-oriented teaching in all modifications and various forms, are derived from the general requirements on a competent teacher (Dostál, 2015; Dostál & Kožuchová, 2016).

The teacher's competencies for research-oriented teaching are defined relatively comprehensively and in three areas: *key competencies*, *basic competencies*, and *threshold competencies*.

In the area of *key competencies* following components are defined: ability to motivate pupils, connect research activities with real life and with theory, demonstrate and interpret pupils' research activities, ensure the safety of activities, develop discovery, thinking, and imagination of students. The *basic competencies* include abilities to prepare, implement, and manage functional and justified research activities of pupils regarding the possibilities of their implementation and in accordance with available resources, develop pupils' interests, educate pupils, develop didactic and subject knowledge, and implement research activities at scientific basis. Among the *threshold competencies* are the abilities to develop cooperation and social relations of pupils, the ability of individualization in these activities, integration of interdisciplinary knowledge, formation of professional orientation of pupils, ability to use of research activities to diagnose the acquired curriculum, to take into account different learning styles, to obtain material resources for research activities, form concepts, to link these activities with the possibility of their continuation outside teaching, to plan these activities in accordance with legislation and teaching documents, to share knowledge about these activities with colleagues, and to integrate these activities into teaching documents. Of course, key competencies and basic competencies overlap.

The demands on teachers' competencies are relatively high. All the competencies can be generalized to problem-based teaching in the broadest sense. It is important to select appropriate current educational content and linking the activities arising from educational content with project activities in condition of vocational education. The teacher should be able to design or manufacture prototypes of products and find the solutions of tasks in problem-based teaching in the appropriate quality and with the required precision. It is

therefore a synthesis of intellectual and psychomotor skills and their appropriate application. As the research shows, problem-based teaching in some countries is not very widespread in pedagogical practice (Dostál & Kožuchová, 2016; Pecina, 2017). It is also confirmed by the research in the conditions of technical vocational education in the Czech Republic (Pecina 2017; Wasserburger, 2018). Review of the training of specialized subjects' teachers at the university and focus on the possibilities of further education of the teachers are needed altogether with the increasing the motivation of teachers in development of their own competencies. An analysis of the unsatisfactory condition and their causes are important as well as the follow-up measures for improvement. Vaněček et al. (2016) emphasizes the importance of creativity in the activities of technical subjects' teachers, because only creative teacher can support the creativity of pupils. It is important that the teacher is willing to support and develop creativity of pupils (Vaněček et al., 2016). This statement corresponds with assumption that teacher of specialized subjects should be able to design and implement products, prototypes, and technical solutions as motivational examples for creative activity of pupils. Zelinová (2004) also focuses on the personality of a creative teacher and defines the characteristics of a creative teacher:

- Creative teacher is intelligent.
- Creative teacher combines playfulness and responsibility.
- Creative teacher is an extrovert or an introvert.
- Creative teacher alternates between imagination, fantasy and anchoring in meaningful reality.
- Creative teacher has a lot of energy, but he also needs to calm down and rest.
- Creative teacher is proud and modest at the same time.
- Creative teacher is a rebel and a conservative man.
- Creative teacher takes his job as a passion.
- Creative teacher is sensitive and can experience pleasure and joy of his work.
- Creative teacher is open.
- Creative teacher can experience quality emotions.

It is obvious that the creative teacher must integrate seemingly conflicting qualities, which differently manifest themselves in different situations. Sometimes a traditional and conservatively proven solutions are effective, but sometimes new approaches and paths need to be tried. It can be risky with a success as well as with a disappointment and material or other loss at the end. However, finding new ways is like that, both in school and in the work of designers, developers, and scientists.

3.3.5 Problem-based and research-oriented teaching in the conditions of digital education and connectivism

Connectivism is referred to as a new paradigm of education (Lorenzová & Svoboda, 2020). Verification of the functionality of constructivist approaches to the teaching within connectivism is the subject of current research (Zounek et al., 2021), along with the search for new theories of e-learning (Haythornthwaite & Andrews, 2011; Zounek et al., 2016). Research in this area shows that modern technologies are already a common and inseparable part of education. However, particularly in administration process, but not in the key teaching and learning process itself. It is common for teaching materials to be placed in an online environment, including multimedia components, learning management systems, and instructions for managing a self-study. Modern technologies enriched the process of learning with high degree of autonomy, flexibility, and adaptation to the individual learning needs of the target group. The starting points for linking and developing a constructivist approach with e-learning are therefore very promising.

However, the rapid emergence and dissemination of information is typical nowadays. Modern information technology tools can search, select, sort, combine, and link information very quickly. This is the basis for a completely new digital learning environment. Some of the activities that pupils used to do are now performed by these technologies. It is therefore necessary to know both the relevant field of expertise with links to online environment and relevant sources of information. Today, *the learning process takes place partly outside of human thinking due to use of digital technologies, which is basic premise of connectivism* (Pecina, 2021; Siemens, 2004; Zounek, 2016). Knowledge is not completely shaped by the individual, as constructivism states, but partly in a process outside the human being and with the use of synthesis (connection) of information. This connection takes place in the field of information resources and in the field of connections between people as well as different cultures, which leads to the better acknowledge of the area and to development of the area. Discussion forums in the field of programming, design activities, sharing procedures and instructions in various areas of technical training, economic education, and other education fields are common nowadays in addition to rich sources of online information.

Although, connectivism is still relatively young to be objectively assessed in terms of benefits and potential reserves, we hold the opinion that the potential for connecting constructivist approach to teaching and connectivism certainly exists. Information technology is powerful, but not almighty. They can help us (or pupils) in a variety of forms in finding and selecting information, but the creative

step, problem solving, exploration and discovery of a new relationship is already up to us (or pupils). Although these technologies are constantly improving and acquiring the ability to learn, *person's creative potential will never be surpassed by artificial intelligence* according to our opinion. *This opens the space for conceiving a new theory and practice of education in the field of connecting constructivist approaches and connectivism.* All educational theories are still relevant and applicable in some phases of learning process, what is referred to as complementarity of educational theories (Tracey, 2009; Zounek et al., 2021). For example, in teaching the introduction to basic knowledge, it is appropriate to apply the classical approach and prepare pupils for constructivist approaches in conditions of connectivism.

3.3.6 Teacher's competencies in the field of problem-based and research-oriented teaching in the conditions of connectivism

Teachers are perceived as bearers and guarantors of digital competencies. Various competency models are emerging in this area. A competency model of a teacher working with ICT was proposed in the conditions of the Czech Republic (Neumajer, 2018). The model from the 2018 is the third revised edition of the model. The model includes a total of 25 competencies, which are divided into six areas:

- Education strategies.
- Teaching environment and content of education.
- Application of ICT in teaching.
- Digital technology.
- Organization and administration.
- Further teachers' education.

A relatively comprehensive view of the area of digital competencies of secondary vocational schools' teachers is provided by collective monography *Digital competencies of secondary vocational schools' teachers as challenge of contemporary education*, which includes theoretical studies, review studies, and research reports both in the national and international context (Svoboda et al., 2020). Digital competencies of teachers are seen as a new literacy that have emerged with the dynamic development of technologies and their application in work, life, and education (Lorencová & Svoboda, 2020). These literacies, intersecting in both the digital dimension of information and the non-digital dimension, are ICT literacy, internet literacy, information literacy, and media literacy (Ala-Mutka, 2011).

3.3.7 Design of a competence framework for teachers in vocational education for the needs of problem-based and research-oriented teaching in digital education

Dostál and Kožuchová (2016) deal with the competences of teachers for research-oriented teaching in their studies in detail. They divided teachers' competencies into three basic groups:

1. *Key competencies*: motivation of pupils to learn, connection of research activities with theory and practical life, demonstration of research activities by the teacher, interpretation of the course and results of research activities, development of independent discovery of knowledge, thinking and imagination by pupils, implementation of research activities in accordance with previous knowledge of pupils.
2. *Basic competencies*: use of research activities in all phases of teaching and improvement of teaching preparation, development of pupils' interests, inclusion of research activities in teaching, creation and maintenance of positive teaching climate, development of pupils' ability to present research results, management of pupils' learning processes within implementation of research activities, planning of research activities of pupils with the use of available aids and equipment, influencing of pupils in education with the use of research activities, preparation, implementation, and evaluation of research activities on a scientific basis.
3. *Threshold competencies*: development of cooperation and social relations with the use of research-oriented activities, implementation of individual approach to pupils and to different learning styles of pupils, application of cross-curricular and interdisciplinary integration through research-oriented activities, influencing pupils in professional orientation, using research-oriented activities to diagnose acquired curriculum, preparation and implementation of research-oriented activities in accordance with curricular documents and regulations, preparation of research-oriented activities with regard to their possible continuation at home after the school teaching, sharing knowledge about research-oriented teaching with other teachers, incorporation the implementation of research-oriented activities into the school curriculum (Dostál & Kožuchová, 2016, pp. 119-126).

These are large groups of competencies that interfere with different areas. The competence framework for teachers in vocational education is further deepened by specifics of teaching process and usage of teaching methods and

approaches in real life. We present *the proposal of the basic competence framework of our own construction for research-oriented teaching of teachers in vocational education in the conditions of digital education*. The teacher in vocational education teaching according to research-oriented approach in the condition of digital education should have:

- Adequate knowledge of contemporary methods, forms, didactic models, and concepts of activating teaching in specific conditions of both non-digital and digital environments, and in application to the combined environment as well.
- Knowledge and ability to set appropriate learning objectives at all levels that correspond to the application of research-oriented teaching in the conditions of digital education.
- Adequate knowledge in the use of appropriate software and related ICT tools for the preparation and implementation of problem-based and research-oriented teaching – software for creating technical and other documentation, programming tools, creating animations, simulations and the use of 3D technologies in teaching, and multimedia editing tools – audio and video sources of information.
- Knowledge in the field of teaching aids and equipment for the preparation, implementation, and evaluation of research-oriented teaching activities of pupils in a digital environment; ability to capture the maximum potential of their implementation in teaching.
- Knowledge of the possibilities and potential of the Internet and online sources and ability to use them in pupils’ research-oriented activities; ability to capture the research potential of information sources in the form of electronic documentation of teaching sets and aids, teaching and instructional videos, discussion forums, and other sources of information.
- Knowledge related to the appropriate placement of problem-based and research-oriented teaching in digital education, ability to capture the problems of the curriculum, prepare appropriate problem-based learning tasks, distribute them to pupils using information technology, and manage the process of solving them in the online environment.
- Knowledge and skills related to the preparation and implementation of practical research teaching activities using digital technologies.
- Knowledge and skills with the preparation, implementation, and evaluation of the project approach in problem-based and research-oriented teaching; ability to design and make prototypes of selected aids and products.
- Knowledge and skills with the preparation, implementation, and evaluation of problem-based and research-oriented teaching in the out-of-school environment and with the use of M-learning and digital information sources.

- Knowledge and skills related to the diagnosis and evaluation of pupils in research-oriented activities in the conditions of digital education.
- Ability to create space for motivating pupils to further education and research-oriented activities in a digital environment.

We perceive the framework as a starting point for further work in the field of application of research-oriented teaching in the conditions of vocational education and in the specific conditions of digital education and connectivism.

3.3.8 Conclusion

In the theoretical study, we dealt with the theoretical framework for the competencies of the teachers in vocational education within the research-oriented and problem-based teaching in the conditions of digital education and connectivism.

We presented a theoretical approach to the topic of research-oriented teaching in a broader and narrower perception. We also emphasized the difference between the concepts of research-oriented teaching and problem-based teaching, and we focused on the specifics of these approaches to teaching in the vocational education. Due to the focus mainly on technical subjects, we introduced the STEM concept and outlined the possibilities of using the concept with respect to the theoretically discussed approaches to teaching. We also analysed the possibilities of applying research-oriented and problem-based teaching in connection with the application of the constructivist approaches to teaching in the conditions of connectivism.

We subsequently used the theoretical analysis and analysis of individual concepts and mutual interrelationships to present the frameworks of teacher competencies in vocational education. We applied the obtained results to the construction of our own competence framework for research-oriented teaching of teachers of vocational education in the conditions of digital education.

Research-oriented teaching in vocational education is a contemporary concept of teaching, the implementation of which is currently envisaged by the current Strategy of the Czech Republic's educational policy until 2030+. The strategy also includes the STEM concept (MŠMT, 2020). The concept offers the opportunity to implement in practice the constructivist principles of teaching and to implement cross-curricular and interdisciplinary integration.

Thus, we think it is desirable to focus on theory development, empirical research, applicable practical-methodological side of this concept, and implementation in real educational practice. Furthermore, our intention is to elaborate this concept

in more detail in the conditions of vocational education by realising action research or experiments in teaching of technical vocational subjects, to grasp it empirically and create a systematic and comprehensive source of information.

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3.4

The quality of teaching and the benefit of the selected general education subjects at the University of Technology

Jaroslav Lindr

Introduction

Teachers and experts call for the general development of students and for necessary acquisition of all the key competencies of graduate. For research purposes in order to determine the benefits of teaching for students, the social science subject Presentation Skills and the subject Mathematics at technical university thought in 2018–2020 were selected. The purpose of these subjects lies in fulfilling the ideal of comprehensive development of students as it is declared in the graduate profile. In order to find the 8–10 most important criteria for the quality of teaching, the results of two statistical methods are presented: the principle component analysis and the forward step method. Criteria such as the need for personal development, intellectual stimulation, the influence of the teacher's personality and the overall impression of teaching, all play a crucial role in the contribution.

In order for the subject to have the required level, it is necessary to evaluate whether it meets the criteria of quality teaching. Furthermore, in the social science subject, students also expect meaningfulness, inspiration and usefulness of the subject. If students do not receive these values, they do not enjoy learning, they do not perceive it as a pleasant, and they feel that it is not needed. The students appreciate the fact that they can express their opinion. For a science subject, a more positive appreciation of the importance of mathematics for technical studies can be expected. However, it turns out that students would appreciate more if the teaching of mathematics was inspiring, interesting, needed for future work and could help students. Negative correlations are exacerbated by the fact that students do not enjoy learning, they are not pleased with it, do not like mathematical related subjects, it is a burden to them and have to study a lot. However, in general terms the students perceive the teaching to be of overall good quality.

Academic study programs, teachers and experts from theory and praxis call for the general development of students. Mastering of all key competencies from university studies becomes a necessity not only to cope with growing professional demands, but also for the successful entry of graduates into praxis. Therefore, it is logical that general development must be given adequate space in the repertoire of other specialised subjects in the academic programs relevant to the given field of study.

The chapter maps the situation at a selected technical university. For this purpose, two general education subjects were selected – one from natural sciences and the other from social sciences. The main purpose of them lies in fulfilling the ideal of general cultivation declared in the graduate's profile. The benefit of these subjects for students is sought. Extensive teaching experience allows

a retrospective view of its implementation and grasp of the phenomenon of benefit for students. This is done by assessing the teaching quality criteria that most influence to the benefit of the subjects.

Social sciences and natural sciences are taught at a selected faculty of the University of Technology. Natural science subjects constitute the theoretical basis of studies of engineering. Social science subjects belong to the complementary subjects. The subject “Presentation Skills” as a representative of social sciences and “Mathematics” as a representative of science were chosen for the empirical research.

It should be noted at the outset that both of these subjects aim to develop those key competencies that contribute to the general cultivation of graduates. Mathematics provides a general theoretical scientific theoretical basis; it is applied in other professional subjects. It is one of the more demanding subjects at the faculty and it is difficult to master it. Presentation skills lead to the improvement of the art of presentation mastery of any topic in order to enhance rhetorical, psychosocial, communicative and presentation skills already in preparation and subsequently in speech to the audience.

The very finding of teaching quality criteria, their formulation and relevant determination of their significance is a research problem posed by partial research questions, namely: What importance do students attach to individual teaching quality criteria? What teaching quality criteria most influence the benefit? Is there a correlation between criteria and benefit?

Answering these questions can help both the theoretical feedback reflection of teaching from a didactic point of view, and the recognition of those quality criteria that students perceive as important.

3.4.1 The aim of the exploratory study and its characteristics

The theoretical part focuses on the justification of the need to represent general education subjects in academic plans at a University of Technology. The practical part tries to find out the benefits of teaching a social science and science subject for students in the form of an empirical study. Research is done through a feedback retrospective questionnaire, in which students commented on the quality of teaching through the proposed criteria for teaching quality.

It is difficult to determine the priority of criteria, or to find the number of criteria that affect the benefits in the positive or negative sense the most or the least. Mere intuitive insight or experience is not enough. Appropriate

mathematical and statistical procedures and methodologies should be used for evaluation. In addition to the descriptive statistical characteristics of the file, the principal component analysis and the step method forward were used, which are described in more detail in part 3.4.4. In addition to statistical methods, correlation coefficients and Cohen's coefficient of effect size are also performed and described again in part 3.4.4. The aim of using these methods was to select from the original 24 criteria 8–10 the most important ones which most influence the quality of teaching. As this is a separate evaluation of two subjects, it is also possible to compare the results. This is done in the final interpretations of the results (see part 3.4.6).

Although the statistical methods used provide different results, it generally appears that these tools can identify important teaching quality criteria that affect the benefit the most. Interestingly, the choice of method affects the output of the results. Their diversity gives room for subsequent broader pedagogical-didactic interpretation.

3.4.2 Theoretical view of quality in education

The chapter mainly presents the results of an empirical study. Therefore, it is not explicitly based on any directly related theoretical sources or similarly oriented research, which are sparse in this science field. Nevertheless, let us briefly present selected views of theorists on how teaching in higher education should look optimally with regard to quality and versatility.

“The demands of today’s school refer to a school in motion, a school developing into a meaningful vision...” (Pol, 2009, pp. 40–41). In this context, the author works with the “concept of accountability”, i.e. the responsibility of the school for the results of its work, towards all entities that are involved in the process of cooperation with the school in various ways.

The IRDAC report (1998, p. 39) reflects on the quality of Czech and European vocational education, which speaks of multidisciplinary as a factor in the quality of schools. It warns that: *“Vocational education should not be seen as a closed learning path... This requires emphasising and developing attractive features, which is seen as multi-source education with a greater emphasis on quality”*. Although the report focuses mainly on strategic planning for the development of vocational education in the context of the socio-economic perspective of society, however, the application of the conceptual perspective also includes pedagogical-didactic views, e.g. need to link technical education with general education.

The need to design an educational project or study program that reflects the modern development of society and at the same time respects the individual

needs of the individual, can be evidenced, for example, by saying that *“the school environment should become a place for the realization of personality, for the cultivation of thinking, for practical activities and experiences, for gaining new experiences”* (Maňák, 2009, p. 18). The school should be open to everything that enriches and cultivates. This means overcoming the traditional concept towards a higher level of competence acquisition and systemic thinking. The student needs teacher’s “scaffolding”, the support of the teacher to learn to gain new knowledge and work with resources and to be able to re-evaluate the original knowledge structures and produce new knowledge or original solutions.

This concept is also reflected in Maňák and Švec (2003), who in this context reformulated or, better said, aptly adapted the term university “self-study” to the term “self-directed study”, which fully respects the student’s autonomy and study strategy, but is mediated by the curriculum or the instructions provided by the teacher. They present four levels of student activity according to the degree of guidance by the teacher (activity forced, induced, independent, engaged), which in result leads to independence. The purpose is to achieve motivation and enthusiasm of students for teaching.

The aim of the school is to approach the ideal of a “good school”. This entails the creation of effective tools for self-esteem and progress, as well as the need to effectively promote these innovative changes (Rýdl, 2003, pp. 45–47). The modernization of the school as an institution can also be perceived in terms of greater openness to the needs of praxis with regard to the better employment of graduates in the labour market.

Ensuring the quality of teaching is linked to evaluation and self-evaluation and reflection on change on the one hand and the creation of conditions for improvement, innovation, etc. on the other. (Hendrichová & Cerych, 1997, pp. 100–107).

Mathematician W. W. Sawyer wrote: *“Bad teaching is one that represents an endless chain of nonsensical words and rules and lacks the roar of imagery.”* (Ramsden, 1992, p. 86). It follows the need to formulate principles that, will lead to good teaching. These principles include, for example, the quality of interpretation and influencing students’ interests, respect for students and their learning, appropriate evaluation and feedback, clear goals and suggestions, independence and active involvement of students in teaching, etc. Ramsden (1992) pays attention to student evaluation, teacher approach to it and the role of the teacher as a supervisor.

Light and Cox (2001) provides guidance on how to make good and effective teaching in the form of structuring strategic areas of teaching skills in higher education, such as keeping students interested throughout teaching, explaining teaching materials clearly, guiding students to critical thinking,

supporting the connection of the topic with the experience of students, effective communication, stimulating students, etc. The authors also deal with the issue of modernization using both traditional elements and new technologies, and modern teaching aids.

Vašutová (2002) goes even further in the characteristics of quality teaching, emphasizing in particular the role of the teacher's personality. She points out that in addition to the quality of teaching, students emphasize the characteristics of the teacher such as: humanity, helpfulness, wisdom, character, correct behaviour, cordiality, patience, tolerance, optimism, reliability, adherence to principles, honesty, sense of humour, etc. On the contrary, poor-quality teaching is considered to be one that contains reckless chatter, weeping, inconsistency, inconceivability of the subject, inability to interpret, incomprehensibility, unpreparedness for teaching, reading instead of lecturing. (Vašutová, 2002, p. 149). Similarly, the author comments on a strongly constructivist conception of teaching, where she finds problems in an uninspiring formulation of problems, where the student only takes over the teacher's indisputable truths, inconsistently piled up in the study text.

It is worth recalling that *“exact disciplines are characterized by the convention of curricular content, its highly organized theoretical structure, the necessary cooperation in research, while the social sciences and humanities disciplines are characterized by a relaxed curriculum, unlimited intellectual boundaries, independent research efforts and tolerance for unusual ideas and methods.”* (Colbeck, 1998, p. 651). This results in a different way of working in professional and social science subjects, different methods, finding solutions, divergent thinking, space for different opinions, which some students with a predominant purely exact, precise technical approach are not completely used to.

The approaches of modern pedagogy represented by Petty (2004) and Pasch, et al. (1998) emphasize, among other things, student-derived teaching goals, cooperative learning, and interdisciplinarity in the quality of teaching. Based on this, they state that motivation, controlled discovery and practical experience lead to unceasing internal motivation in some, and conversely in others the absence of these facilitations leads to disinterest and reluctance to learn. The teacher opens the door, but the student must enter on their own.

Rogers' question may sound slightly provocative, why is it good to analyse student needs on the basis of a retrospective analysis from previous years and thus complicate life when a student still gets only what the teacher has prepared in the classroom? That is why, for example, Švec (1999) calls for experiential learning with the use of self-reflection and monitoring of teacher teaching as a tool for successful motivation of pupils, to which the university training of future teachers should also aim. Švec emphasizes the importance of the phenomenon

of explaining the curriculum, which consists in guiding students to understand and master the core of the message. The lecture is about dealing with ideas.

The emphasis on ensuring the quality of teaching and its continuous monitoring is found to be a necessary moment in the implementation of teaching at the university. „*Important factors include human resources and especially the ability to continuously innovate and respond flexibly to internal and external stimuli from all actors who can contribute to change or improvement*” (Adamec, 2018, p. 71). In its research conclusions, it points to the need to implement all study programs purposefully, effectively, efficiently and with all responsibility, including lifelong learning programmes, which it thoroughly analyses. However, he finds that monitoring the quality of teaching is not always and not everywhere taken with the necessary commitment, because in the implementation of teaching, economic considerations prevail over others.

In educational practice, it is also a matter of the graduate managing the literacy of a certain subject at the same time as a functional competence. In order for the knowledge from the school to provide successful support for its updates in various forms in praxis, which corresponds to the current situation conditions. Slavík, et al. (2017, p. 193) warns that “*if, on the contrary, a comprehensive competence is overestimated at the expense of literacy, the meaning disappears, the pupil ‘does not know that he does not know’, and even ‘does not know that he does not know’*”.

Pöschl (2011) deals with the tools for evaluating the quality of teaching, who for this purpose works with criteria such as that teaching is: useful – useless, weak – strong, monotonous – varied, old – young, slow – fast, etc., whereas the proposed criteria are sometimes emotionally oriented focused on the individual’s experience in relation to school.

Michek (2009) also deals with the possibilities of teaching quality evaluation, who proposes the use of the benchmarking method known from economic theories as a tool for criteria evaluation or comparison of phenomena, the search for best practices and their subsequent implementation.

Helmke (2008, p. 10) formulates ten factors influencing the quality of teaching such as: efficiency of classroom management and use of time, structure and clarity, consolidation and consolidation, activation, motivation, learning climate supporting learning, pupil orientation, treatment of heterogeneity, diversity of offer and focus on competencies, etc.

Meyer (2009, pp. 23–27) follows a similar approach, which also formulates ten factors influencing the quality of teaching such as: clear structuring of teaching, high share of learning time, climate supporting learning, content clarity, sense of communication, diversity of methods, individual support, smart workouts, transparent performance expectations and a ready environment.

Zlatníček, et al. (2010, p. 23) believe that the study of various aspects of teaching quality is “*the domain of mathematics, science and foreign language education in particular, and the field of social sciences or arts education is less represented*”. This statement shows the difficulty of evaluating the quality of teaching, including formulation of concise criteria according to which it would be possible to characterise the quality quantitatively, because the qualitative characteristic is, according to the author, interpretatively problematic.

Let us return briefly to the question of motivating teachers of specialised subjects for further education and for self-education. According to the research conclusions (Adamec, 2019, p. 176), “respondents from the ranks of teachers of specialised subjects ranked the factors in the first three places in the order of: at first, the opportunity to learn something new, at the second the opportunity to gain new knowledge about solving problems in working with students and at the third the opportunity to implement the acquired knowledge in teaching. A significant motivating factor is also the opportunity to discuss problems with experts or the opportunity to meet colleagues and exchange experience.”

At the end of the theoretical overview, let us poetically recall the university teacher J. Peskova and her legacy in Svobodová’s reflection (2006), in which the effort for multidisciplinary and interconnection of various specializations is evident. The proposed concepts of discussions led by the effort to unite were not in an atmosphere of destruction, peaking and dishonesty of the opinions of others, but in an emphasized effort to meet from different sides on a common theme, on the philosophical dimension of our world.

It is this concept that is the inspiration and it can be said that one of the intellectual justifications for the inclusion of social sciences and science subjects in the academic study plans at the University of Technology, the evaluation of which is the subject of this chapter.

3.4.3 Survey implementation, choice of criteria

The teaching quality survey was conducted in the form of an anonymous feedback questionnaire in the period of 2018–2020. The questionnaire was filled in by $n = 96$ students for social sciences, by $n = 60$ students for mathematics, all aged 23–25, by a total of $n = 156$ students. The aim was to evaluate the quality of teaching through the offered criteria and to find out which criteria have the most influence the benefit of the subject by the students’ eyes as well.

Let us recall that the basic, and as it turned out to be quite a challenging problem in terms of processing, was the need to reduce the original number of 24 criteria to 8–10 key of ones, the most fundamental. The choice of a mathematical-statistical method was already a difficult methodological issue and a great deal of effort in entering the results. At the same time, as it turned out, the choice of method also affected the final selection of criteria. This fact underlines the complexity of data processing and the difficulty of clearly finding the most relevant criteria. The research plan, therefore, was set out to find exactly the most important criteria, using statistical methods. The aim of the empirical study lies mainly in the mathematical processing of data and their evaluation.

The semantic differential was used to construct the anonymous questionnaire, with the help of which students commented on the scale of 1–7 on how they evaluate the individual criterion. An example of teaching quality criteria is the statement that teaching is:

- 1 = need for my personal development – 7 = not need for my personal development,
- 1 = intellectually enriching – 7 = not intellectually enriching,
- 1 = up to date – 7 = out of date,
- 1 = “I understand the topics discussed” – 7 = “I do not understand the topics discussed”, etc.

As for the choice of criteria and their compilation, it is primarily the author’s own invention. Although some criteria according to S. Michek or R. Pöschl served as inspiring guidelines, in this research all criteria were designed, formulated and implemented only by the author. The criteria follow the following teaching characteristics:

- reflection on the learning process (“it has a positive effect on my character”, “I welcome the extension of teaching”),
- construction of students’ knowledge (intellectually enriching, “I have to learn a lot”, teaching is logical),
- support and motivation (“teaching is pleasant for me”, “I enjoy teaching”, “I like the subject”, “it burdens me”),
- the role of the teacher as a teaching guide (“teachers had a positive effect on me”, overall teaching quality),
- cooperation of students (leads to communicativeness, “I have the opportunity to express my opinion”),
- discovery and encouragement, alternative elements (inspirational, modern, practical, teaching “can help me”),
- student autonomy and its personal development (needed for the future work, needed for personal development etc.).

The used mathematical-statistical evaluation serves for the exact processing, which would not be methodologically and scientifically tangible in an intuitive way or with an excessive emphasis on pedagogical experience only. On the contrary, the aim is not a theoretical-pedagogical-philosophical treatise on the use of pedagogical theories or the creation of general integrating pedagogical-didactic ideas. The aim is to find a purely practical view of the benefits of teaching through the eyes of students and how the students themselves perceive the teaching. The article tries to recognize which of the teaching criteria students value the most.

Let us point out that the selected subjects from the field of social science and science, which belong to the theoretical and supplementary subjects at the University of Technology, which do not aim at a direct deepening of the professional line. This fact can also play an important role in the perception of meaningfulness, usefulness, need and benefit of the subject for students.

3.4.3.1 Working with data and their evaluation

The empirical study focuses on the exact – not only intuitive – possibilities of finding teaching quality criteria that affect the benefit of the subject to the student and are found to be significant. The seemingly simple task becomes more complex when is elaborated.

To reduce the number of criteria or recognize of the most important influencing the benefit, were used:

- Step method forward as multidimensional regression analysis. The result is criteria that show a significant effect on benefit, by refuting the hypothesis at $p \leq 0.05$ that the criterion has no effect on benefit.
- Principal component analysis as a multidimensional survey technique. It consists in the fact that based on the evaluation of eigenvalues we compile the so-called main component, which we can understand as a linear combination of individual factors (components), such as those for which the eigenvector is $\lambda \geq 1.0$. Furthermore, the most important criteria are selected from these factors.
- Paired *t*-test of dependent variables. A benefit – criterion pair was always tested.
- Cohen's coefficient of size effect *d* monitors how important is a significant difference between the mean values of the benefit – criterion. In the case of $d > 0.8$ this is a large size effect, on the contrary in the case of $d < 0.2$ it is a negligible effect.
- Correlation coefficient *r* used to express the degree of connection between benefit and individual criteria.

In the end, a comparison of the results of the various used methods between the social science subject and the science subject is made. STATISTICA 12 software was used for statistical processing.

3.4.4 Summary of results – the analysis of teaching quality criteria

Let us now turn to the presentation of the results produced by the methods used, first for the subject of Social Sciences *Presentation Skills* and for the subject of Natural Sciences *Mathematics*.

3.4.4.1 Overview of findings for Social Sciences

Basic descriptive characteristics of the file

Let us now turn to a more detailed analysis of the results. Table 8 provides an overview of selected criteria affecting the contribution to which students commented on a scale of 1-7 of semantic differential in the questionnaire. From the point of view of arithmetic means, it is intuitively clear which teaching criteria students value the most and which, on the contrary, the least. The students' expression is represented by the arithmetic mean m and the standard deviation σ . Table 8 summarizes all the criteria used for better clarity.

Table 8

An overview of the selected teaching quality criteria for social science subject – descriptive statistics

No.	Selected criteria (on a scale 1-7)	AM: m , SD: σ
1	1 = Beneficial - 7 = Non-beneficial	$m = 2.604$ $\sigma = 1.498$
2	1 = Interesting - 7 = Uninteresting	$m = 2.667$ $\sigma = 1.294$
3	1 = Inspirational - 7 = Non-inspirational	$m = 2.917$ $\sigma = 1.427$
4	1 = Modern - 7 = Out of date	$m = 3.063$ $\sigma = 1.668$
5	1 = "Pleasant for me" - 7 = "Not pleasant for me"	$m = 2.917$ $\sigma = 1.568$
6	1 = Intellectually enriching - 7 = Not intellectually enriching	$m = 2.583$ $\sigma = 1.772$

No.	Selected criteria (on a scale 1-7)	AM: m , SD: σ
7	1 = Needed for personal development - 7 = Not needed for personal development	$m = 2.271$ $\sigma = 1.278$
8	1 = Needed for the future work - 7 = Not needed for the future work	$m = 2.813$ $\sigma = 1.864$
9	1 = "I enjoy" teaching - 7 = "I do not enjoy" teaching	$m = 2.958$ $\sigma = 1.529$
10	1 = Teachers have positively influenced me - 7 = Teachers have not positively influenced me	$m = 3.334$ $\sigma = 1.928$
11	1 = Leads to communicativeness - 7 = Does not lead to communicativeness	$m = 2.334$ $\sigma = 1.173$
12	1 = Teaching "can help me" - 7 = Teaching "cannot help me"	$m = 2.083$ $\sigma = 1.381$
13	1 = Practical - 7 = Too theoretical	$m = 2.792$ $\sigma = 1.443$
14	1 = "I understand the topics discussed" - 7 = "I do not understand the topics discussed"	$m = 2.167$ $\sigma = 0.930$
15	1 = "Does not burden me" - 7 = "It burdens me"	$m = 2.833$ $\sigma = 1.883$
16	1 = "I have the opportunity to express my opinion" - 7 = "I do not have the opportunity to express my opinion"	$m = 1.896$ $\sigma = 1.096$
17	1 = "It has a positive effect on my character" - 7 = "It has a negative effect on my character"	$m = 2.583$ $\sigma = 1.028$
18	1 = Overall good quality teaching - 7 = Overall poor quality teaching	$m = 2.813$ $\sigma = 1.232$
19	1 = "I have to learn a lot" - 7 = "I do not have to learn a lot"	$m = 4.813$ $\sigma = 1.671$
20	1 = Topics are logical - 7 = Topics are not logical	$m = 2.625$ $\sigma = 1.123$
21	1 = Meaningful - 7 = Meaningless	$m = 2.604$ $\sigma = 1.380$
22	1 = "I welcome the extension of teaching" - 7 = "I do not welcome the extension of teaching"	$m = 3.604$ $\sigma = 1.783$
23	1 = "I like Social Sciences" - 7 = "I do not like Social Sciences"	$m = 3.063$ $\sigma = 1.668$
24	1 = Up to date - 7 = Out of date	$m = 2.854$ $\sigma = 1.529$

Note: number of respondents: $n = 96$

Looking at the arithmetic means of the criteria, it is clear that students appreciate the most when teaching:

- students have the opportunity to express their opinion ($m = 1.896$),
- can help students ($m = 2.083$),
- students understand the topics discussed ($m = 2.167$),
- is needed for personal development ($m = 2.271$),
- leads to communicativeness ($m = 2.334$),
- is intellectually enriching ($m = 2.583$).

Students perceive it unfavourably when the teaching of the subject:

- is (perceived) contradictory in that it does not have to learn ($m = 4.813$),
- does not welcome the extension of teaching ($m = 3.604$),
- students were negatively affected by teachers ($m = 3.334$),
- not modern ($m = 3.063$),
- when they generally do not like social science subjects ($m = 3.063$).
- students do not enjoy teaching ($m = 2.958$).

An overview of the results obtained according to the step method forward

As indicated above, another goal of statistical processing is to reduce the original number of 24 criteria to the most important ones. This step is not easy, as it requires (in addition to the mechanical laboriousness of capturing data) the need to consider methods that can reduce this quantitative richness.

Table 9 presents the criteria that emerged as significant from the step method forward. It searches for all criteria that affect the benefit ($p \leq 0.05$) most significantly, i.e. they reject the null hypothesis of agreement with benefit. Technically, all other criteria are chosen as independent, while the benefit is set as dependent. This is a method of multiple linear regression.

Table 9*Selected important criteria according to step method forward*

No.	Selected criteria (on a scale 1-7)	P-value
1	1 = Meaningful - 7 = Meaningless	0.0001
2	1 = Inspirational - 7 = Non-inspirational	0.0104
3	1 = "I have the opportunity to express my opinion" - 7 = "I do not have the opportunity to express my opinion"	0.0179

Note: number of respondents: n = 96

An overview of the results obtained according to the principal component analysis

Table 10 presents the most important criteria influencing the benefits provided by the principal component analysis. It grouped the criteria into factors (components), of which five factors appear to be significant (according to their eigenvalues $\lambda > 1.0$). These factors list the criteria that are most relevant to the factor. Let us remind that Table 10 already lists only those criteria that the analysis assessed as important.

Table 10*Factor coordinates to principal component analysis – social science subject*

No.	Criteria (on scale 1-7)	0,462 × Factor 1 coefficients of the criteria ($\lambda = 10.529$)	0,086 × Factor 2 coefficients of the criteria ($\lambda = 1.974$)	0,062 × Factor 3 coefficients of the criteria ($\lambda = 1.433$)	0,054 × Factor 4 coefficient of the criteria ($\lambda = 1.231$)	0,053 × Factor 5 coefficient of the criteria ($\lambda = 1.228$)
1	1 = "I enjoy teaching" - 7 = "I do not enjoy teaching"	-0.8460				
2	1 = Meaningful - 7 = Meaningless	-0.8213				
3	1 = "Pleasant for me" - 7 = "Not pleasant for me"	-0.8103				
4	1 = Intellectually enriching - 7 = Not intellectually enriching	-0.8068				
5	1 = Needed for personal development - 7 = Does not need for personal development	-0.8005				
6	1 = "Does not burden me" - 7 = "It burdens me"		-0.5610			
7	1 = Up to date - 7 = Out of date		0.4617			
8	1 = "I have to learn a lot" - 7 = "I do not have to learn a lot."		0.4178			
9	1 = "I understand the topics discussed" - 7 = "I do not understand the topics discussed"			-0.5516		
10	1 = Teaching "can help me" - 7 = Teaching "cannot help me"			0.5183		
11	1 = Inspirational - 7 = Non-inspirational				-0.4441	
12	1 = "I have the opportunity to express my opinion" - 7 = "I do not have the opportu- nity to express my opinion"					0.3803

Note: number of respondents: n = 96

Mathematically, it can be expressed that the main component is a linear combination of individual factors. Specifically:

Main component = 0.462 × Factor 1 (component 1) + 0.086 × Factor 2 (component 2) + 0.062 × Factor 3 (component 3) + 0.054 × Factor 4 (component 4) + 0.053 × Factor 5 (component 5) + others

Similarly, it is possible to consider individual factors, which are formed as a linear combination of individual criteria, while the coefficients represent their significance in a given component.

Factor 1 (component 1) = | -0.8460 | × “I enjoy teaching” + | -0.8213 | × meaningful + | -0.8103 | × teaching is “pleasant for me” + | -0.8068 | × intellectually enriching + | -0,8005 | × needed for personal development + others

Factor 2 (component 2) = | -0.5610 | × teaching “burdens me” + 0.4617 | × up to date + | 0.4178 | × “I have to learn a lot” + others

Factor 3 (component 3) = | -0.5516 | × “I understand the topics discussed” + | 0.5183 | × teaching “can help me” + others

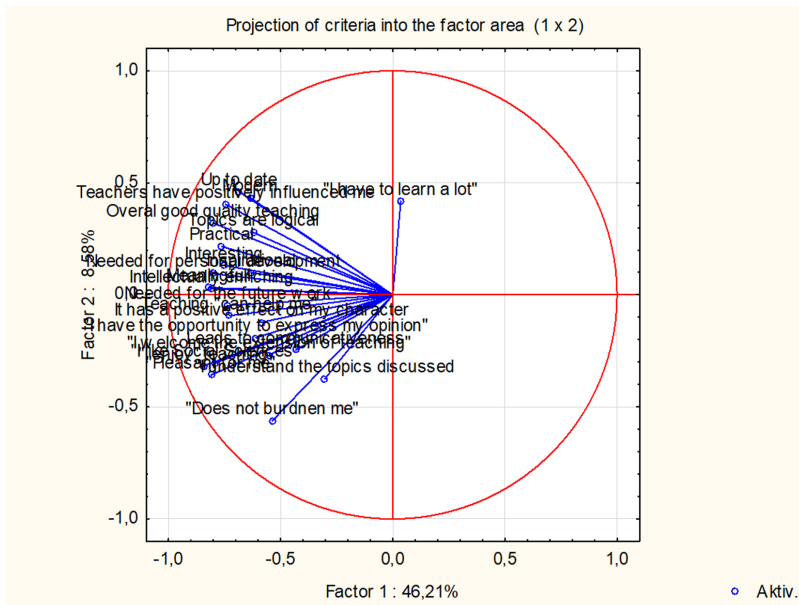
Factor 4 (component 4) = | -0.4441 | × inspirational teaching + others

Factor 5 (component 5) = 0.3803 × “I have the opportunity to express my opinion” + others

The negative coefficients of some criteria can be considered as astonishing. However, we are mainly looking for the significance of the criteria, i.e. the correlation dependence, not the sign of correlation (the absolute value of the coefficient is removed). A negative sign indicates that students highly value f. e. intellectual enrichment, positive influence of the teacher’s personality, when teaching is pleasant for them, etc., but it plays a rather negative role in this subject. If the status of these criteria improved, the perception of benefits would probably be increased. Significant criteria grouped into a Factor 1 or Factor 2 can be represented graphically – see Graph 18.

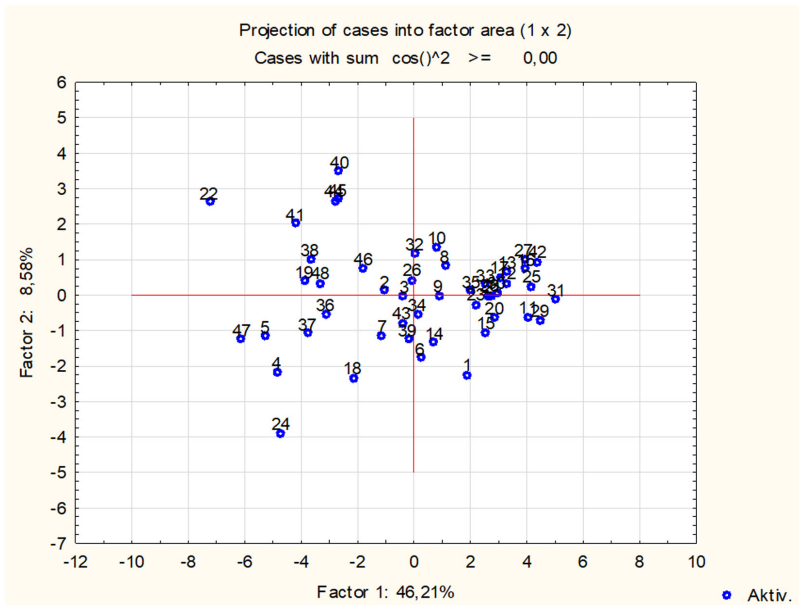
Graph 18

Projection of criteria into the factor area (Factor 1 vs. Factor 2)



Graph 19

Projection of cases into the factor area (Factor 1 vs. Factor 2)



As the projection in Graph 18 or in Graph 19 shows, the key to the answer to the most important criteria can be found in the view of Factor 1 or Factor 2. The greater the distance from the centre, the more important the criterion. The significance of Factor 1 is 0.492, which shows that the criteria belonging to this factor can be considered crucial. The criteria found in Factor 1 include:

- “I enjoy teaching” ($x_{11} = -0.8460$),
- meaningful ($x_{12} = -0.8213$),
- “is pleasant for me” ($x_{13} = -0.8103$),
- intellectually enriching ($x_{14} = -0.8068$),
- needed for personal development ($x_{15} = -0.8005$) etc.

Similarly, the criteria included in Factor 2 are found to be less significant with a coefficient of 0.086. The criteria found in this way in Factor 2 include:

- teaching “burdens me” ($x_{21} = -0.5610$),
- up to date ($x_{22} = 0.4617$),
- “I have to learn a lot” ($x_{23} = 0.4178$) etc.

An overview of the results obtained according to further statistical processing

The criterion pre-selection with the help of the above-mentioned two statistical methods made it possible to proceed to the actual evaluation of the link between significant criteria and benefits, as shown in Table 11. It gradually calculates the difference between arithmetic means $|m_1 - m_2|$ (i.e., deviation from benefit) and also a paired t -test of dependent variables that statistically assesses the differences in the mean values of a pair benefit - criterion. The Cohen's coefficient of effect size d is calculated, which also aims to reveal the effect of the criterion on the benefit. Correlation coefficient r , which attempts to find the correlation between the criterion and the benefit. The more significant is the change in the criterion, the more significant impact on benefits it will have.

Table 11

Combination of criteria influencing the benefit of the subject in relationship “benefit – criterion” for social science subject

Criterion 1 = Benefit	Criterion 2	Difference $ m_1 - m_2 $	P-value	Null hypothesis $H_0: \mu_1 = \mu_2$	Cohen's coefficient of size effect d	Correlation coefficient r
Benefit $m_1 = 2.604$	“I enjoy teaching” $m_2 = 2.958$	0.354	0.045	Significant	0.300	0.689
Benefit $m_1 = 2.604$	Meaningful $m_2 = 2.604$	0.000	1.000	Non-significant	0.000	0.725
Benefit $m_1 = 2.604$	“Pleasant for me” $m_2 = 2.917$	0.313	0.096	Non-significant	0.245	0.656
Benefit $m_1 = 2.604$	Intellectually enriching $m_2 = 2.583$	0.021	0.921	Non-significant	0.014	0.610
Benefit $m_1 = 2.604$	Needed for personal development $m_2 = 2.271$	0.334	0.096	Non-significant	0.245	0.520
Benefit $m_1 = 2.604$	“Does not burden me” $m_2 = 2.833$	0.229	0.349	Non-significant	0.136	0.527
Benefit $m_1 = 2.604$	Up to date $m_2 = 2.854$	0.250	0.301	Non-significant	0.151	0.401
Benefit $m_1 = 2.604$	“I have to learn a lot” $m_2 = 4.812$	2.208	0.001	Significant	1.012	0.055
Benefit $m_1 = 2.604$	“I understand the topics discussed” $m_2 = 2.167$	0.438	0.068	Non-significant	0.270	0.170
Benefit $m_1 = 2.604$	Teaching “can help me” $m_2 = 2.083$	0.521	0.020	Significant	0.347	0.458
Benefit $m_1 = 2.604$	Inspirational $m_2 = 2.917$	0.313	0.109	Non-significant	0.236	0.591
Benefit $m_1 = 2.604$	“I have the opportunity to express my opinion” $m_2 = 1.896$	0.708	0.001	Significant	0.588	0.609

Note: number of respondents: n = 96

The results of the group of students as a whole show that the students see the benefit of the subject slightly above average ($m = 2.604$). Very close arithmetic means (i.e. $|m_1 - m_2| \leq 0.400$, usually large p -value, small to negligible Cohen's coefficient of effect size $d < 0.5$) are based mainly on the following pairs of criteria:

- benefit - meaningfulness ($|m_1 - m_2| = 0.000$; $p = 1.000$; $d = 0.000$),
- benefit - intellectual enrichment ($|m_1 - m_2| = 0.021$; $p = 0.921$; $d = 0.656$),
- benefit - teaching "burdens me" ($|m_1 - m_2| = 0.229$; $p = 0.349$; $d = 0.136$),
- benefit - topicality ($|m_1 - m_2| = 0.250$; $p = 0.301$; $d = 0.151$),
- benefit - inspiration ($|m_1 - m_2| = 0.313$; $p = 0.109$; $d = 0.236$),
- benefit - need for personal development ($|m_1 - m_2| = 0.334$; $p = 0.096$; $d = 0.245$).

It is worth noting the criteria where the null hypothesis of equal means is rejected, i.e. the p -value is $p \leq 0.05$.

- benefit - "I like teaching" ($p = 0.045$; $d = 0.300$),
- benefit - "I don't have to learn much" ($p = 0.001$; $d = 1.012$),
- benefit - teaching "can help me" ($p = 0.020$; $d = 0.347$),
- benefit - "I have the opportunity to express my opinion" ($p = 0.001$; $d = 0.588$).

Apparently, students are "in a good way" surprised by the nature of the teaching, because they can express their opinions, they enjoy teaching, they do not have to learn much, teaching helps them, teaching is also meaningful, intellectually enriching etc.

As further confirmed by the statistical evaluation, according to the size of the correlation coefficient r , there is possible to divide the degree of mutual relationship between benefit and criterion into pairs of criteria with a very close connection with benefit (correlation coefficient $r > 0.600$), which includes:

- benefit - meaningfulness ($r = 0.725$),
- benefit - "I like teaching" ($r = 0.689$),
- benefit - "it is pleasant for me" ($r = 0.656$),
- benefit - intellectually enriching ($r = 0.610$).

For these criteria, it can be assumed that a change in these factors may lead to a more significant change in the perception of benefit. According to the size of the correlation coefficient r , we can further trace a pair of criteria with a small correlation (correlation coefficient $r < 0.400$), which includes:

- benefit - "I have to learn a lot" ($r = 0.055$),
- benefit - I understand the topics discussed ($r = 0.170$),
- benefit - up to date ($r = 0.401$).

In accordance with the theory of correlation, these criteria can be assumed that changing these factors will not significantly change the perception of benefits. It is somewhat surprising, as the complexity of teaching or understanding topics should purely theoretically, but significantly affect the relationship to the subject and its perception by students. According to the detected correlation this is not the case and students are satisfied with the teaching.

3.4.4.2 An overview of the results obtained for Mathematics

Basic descriptive characteristics of the file

Table 12 provides an overview of selected criteria affecting the contribution of the subject, to which students commented on a scale of 1-7 semantic differential in the questionnaire. The students' expression is represented by the arithmetic mean m and the standard deviation σ .

Table 12 summarizes all the used criteria for clarity. From the point of view of arithmetic means, it is intuitively clear which teaching criteria students value the most and which, on the contrary, the least. For easier orientation, the most important ones are listed under Table 12 or more conspicuous criteria, which may be more relevant to the benefit.

Table 12

An overview of selected teaching quality criteria for mathematics – descriptive statistics

No.	Selected criteria (on scale 1-7)	AM: m , SD: σ
1	1 = Beneficial - 7 = Non-beneficial	$m = 3.667$ $\sigma = 1.668$
2	1 = Interesting - 7 = Uninteresting	$m = 4.167$ $\sigma = 1.743$
3	1 = Inspirational - 7 = Non-inspirational	$m = 4.400$ $\sigma = 1.182$
4	1 = Modern - 7 = Out of date	$m = 4.900$ $\sigma = 1.423$
5	1 = "Pleasant for me" - 7 = "Not pleasant for me"	$m = 4.400$ $\sigma = 1.694$
6	1 = Intellectually enriching - 7 = Non-intellectually enriching	$m = 3.700$ $\sigma = 1.765$
7	1 = Needed for personal development - 7 = Not needed for personal development	$m = 3.267$ $\sigma = 1.574$

No.	Selected criteria (on scale 1-7)	AM: m , SD: σ
8	1 = Needed for the future work - 7 = Not needed for the future work	$m = 3.767$ $\sigma = 1.851$
9	1 = "I enjoy teaching" - 7 = "I do not enjoy teaching"	$m = 4.067$ $\sigma = 1.761$
10	1 = Teachers have positively influenced me - 7 = Teachers have not positively influenced me	$m = 4.967$ $\sigma = 1.520$
11	1 = Leads to communicativeness - 7 = Does not lead to communicativeness	$m = 5.334$ $\sigma = 1.605$
12	1 = Teaching "can help me" - 7 = Teaching "cannot help me"	$m = 3.900$ $\sigma = 1.583$
13	1 = Practical - 7 = Too theoretical	$m = 4.633$ $\sigma = 1.938$
14	1 = "I understand topics discussed" - 7 = "I do not understand topics discussed"	$m = 3.800$ $\sigma = 1.606$
15	1 = "Does not burden me" - 7 = "It burdens me"	$m = 4.567$ $\sigma = 1.794$
16	1 = "I have the opportunity to express my opinion" - 7 = "I do not have the opportunity to express my opinion"	$m = 4.800$ $\sigma = 1.499$
17	1 = "It has a positive effect on my character" - 7 = "It has not a positive effect on my character"	$m = 4.400$ $\sigma = 1.429$
18	1 = Overall good quality teaching- 7 = Overall poor quality teaching	$m = 3.600$ $\sigma = 1.221$
19	1 = "I have to learn a lot" - 7 = "I do not have to learn a lot"	$m = 3.300$ $\sigma = 1.725$
20	1 = Topics are logical - 7 = Topics are not logical	$m = 3.233$ $\sigma = 1.382$
21	1 = Meaningful - 7 = Meaningless	$m = 4.033$ $\sigma = 1.426$
22	1 = "I welcome extension of teaching" - 7 = "I do not welcome extension of teaching"	$m = 5.233$ $\sigma = 1.696$
23	1 = "I like mathematics subjects" - 7 = "I do not like mathematics subjects"	$m = 3.833$ $\sigma = 1.821$
24	1 = Up to date - 7 = Out of date	$m = 4.600$ $\sigma = 1.354$

Note: number of respondents: $n = 60$

Looking at the arithmetic means of the criteria, it is clear that students appreciate the most when:

- topics are logical ($m = 3.233$),
- “I have to learn a lot” ($m = 3.300$),
- overall good teaching quality ($m = 3.600$),
- need for personal development ($m = 3.767$),
- students understand the topics discussed ($m = 3.800$),
- it can help students ($m = 3.900$).

Students perceive unfavourably when the teaching of the subject:

- does not lead to communicativeness ($m = 5.334$),
- students were negatively affected by teachers ($m = 4.967$),
- not modern ($m = 4.900$),
- not practical ($m = 4.633$),
- out of date ($m = 4.600$),
- burdens students ($m = 4.567$).

An overview of the results obtained according to the step method forward

As indicated above, another goal of statistical processing in particular is to reduce the original number of 24 criteria to the most important ones. This step is not easy, as it requires (in addition to the mechanical laboriousness of capturing data) the need to consider suitable methods that can reduce this quantitative richness.

Table 13 presents the significant criteria that emerged as significant from the step method forward. It looks for all the criteria that affect the benefit ($p \leq 0.05$) most significantly. Technically, all other criteria are chosen as independent, while the benefit is set as dependent. The greatest match between the benefit and the criteria is sought so that it is clear which criteria have the greatest impact on the benefit. This method belongs to multiple linear regression.

Table 13*Selected criteria according to the step method forward for mathematics*

No.	Chosen criteria (on scale 1-7)	P-value
1	1 = Needed for the future work - 7 = Not needed for the future work	0.0001
2	1 = Inspirational - 7 = Not-inspirational	0.0001
3	1 = "I welcome the extension of teaching" - 7 = "I do not welcome the extension of teaching"	0.0039
4	1 = "I have to study a lot" - 7 = "I do not have to study a lot"	0.0164
5	1 = Overall good quality teaching - 7 = Overall poor quality teaching	0.0259
6	1 = Intellectually enriching - 7 = Not intellectually enriching	0.0187
7	1 = "I like mathematical subjects" - 7 = "I do not like mathematical subjects"	0.0250
8	1 = "I understand topics discussed" - 7 = "I do not understand topics discussed"	0.0200
9	1 = Meaningful - 7 = Meaningless	0.0395

Note: number of respondents: n = 60

An overview of the results obtained according to the principal component analysis

Table 14 presents the most important criteria influencing the benefits provided by the main component analysis. It grouped the criteria into factors (components), of which five factors appear to be significant (according to their eigenvalue $\lambda > 1.0$), i.e. Factors 1-5. The factors list the criteria that are most important in the given factor.

Table 14*Factor coordinates for mathematics by the method of principal component analysis*

No.	Criteria (on scale 1-7)	0.508 × Factor 1, coefficients of the criteria ($\lambda = 11.469$)	0.088 × Factor 2, coefficients of the criteria ($\lambda = 2.029$)	0.067 × Factor 3, coefficients of the criteria ($\lambda = 1.547$)	0.059 × Factor 4, coefficients of the criteria ($\lambda = 1.364$)	0.051 × Factor 5, coefficients of the criteria ($\lambda = 1.175$)
1	1 = "I enjoy teaching" - 7 = "I do not enjoy teaching"	-0.9012				
2	1 = "I like mathematical subjects"- 7 = "I do not like math. subjects"	-0.8609				
3	1 = "It burdens me" - 7 = "It does not burden me"	-0.8593				
4	1 = "Pleasant for me" - 7 = "Not pleasant for me"	-0.8532				
5	1 = Interesting - 7 = Not interesting	-0.8418				
6	1 = Intellectually enriching - 7 = Not intellectually enriching	-0.8101				
7	1 = Meaningful - 7 = Meaningless	-0.8101				
8	1 = Teaching "can help me" - 7 = Teaching "cannot help me"	-0.8096				
9	1 = Modern teaching - 7 = Out of date teaching		-0.4398			
10	1 = "I welcome the extension of teaching" - 7 = "I do not welcome extension of teaching"			0.6056		
11	1 = Up to date - 7 = Out of date			0.3851		
12	1 = "I have the opportunity to express my opinion" - 7 = "I do not have the opportunity to express my opinion"				-0.4232	
13	1 = "It has a positive effect on my character" - 7 = "It has not a positive effect on my character"					0.2977

Note: number of respondents: n = 60

Mathematically, we can express that the main component is a linear combination of individual factors, specifically:

$$\begin{aligned} \text{Main component} &= 0.508 \times \text{Factor 1 (component)} \\ &+ 0.088 \times \text{Factor 2 (component 2)} + 0.067 \times \text{Factor 3 (component 3)} \\ &+ 0.059 \times \text{Factor 4 (component 4)} + 0.051 \times \text{Factor 5 (component 5)} + \text{others} \end{aligned}$$

Similarly, it is possible to consider individual factors, which are formed as a linear combination of individual criteria, while the coefficients for which represent their significance in a given component.

$$\begin{aligned} \text{Factor 1 (component 1)} &= |-0.9012| \times \text{"I enjoy" teaching} + |-0.8609| \times \text{"I like mathematical subjects"} \\ &+ |-0.8532| \times \text{teaching is "pleasant for me"} + |-0.8593| \times \text{"does not burden me"} + \\ &|-0.8418| \times \text{interesting teaching} + |-0.8101| \times \text{intellectually enriching} + |-0.8101| \times \text{meaningfulness} \\ &+ |-0.8096| \times \text{teaching "can help me"} + \text{others} \end{aligned}$$

$$\text{Factor 2 (component 2)} = |-0.4398| \times \text{modern teaching} + \text{others}$$

$$\text{Factor 3 (component 3)} = |-0.6056| \times \text{"I welcome the extension of teaching"} + |0.3851| \times \text{up to date} + \text{others}$$

$$\text{Factor 4 (component 4)} = |-0.4232| \times \text{"I have the opportunity to express my opinion"} + \text{others}$$

$$\text{Factor 5 (component 5)} = 0.2977 \times \text{teaching "has a positive effect on my character"} + \text{others}$$

Negative coefficients for some criteria can be considered somewhat paradoxical. We are mainly searching the significance of the criteria, i.e. the correlation dependence, not the sign of correlation (it is removed by the absolute value of the coefficient). A negative sign indicates that students do not evaluate f. e. intellectual enrichment, the influence of the teacher's personality, the fact that teaching "is unpleasant" for them, etc. However, this does not change the fact that the selected criteria significantly affect the benefit. Significant criteria grouped into a Factor 1 or Factor 2 can also be represented graphically – see Graph 20.

As the projection in Graph 20 clearly shows, the key to the answer to the most important criteria can be found in the view of Factor 1 or to a Factor 2. The greater the distance from the centre, the more important is the criterion. The significance of Factor 1 is 0.508, which shows that the criteria belonging to this factor can be considered crucial. The criteria found in this Factor 1 include:

- “I enjoy” teaching ($x_{11} = -0.9012$),
- “I like mathematics subjects” ($x_{12} = -0.8609$),
- “It does not burden me” ($x_{13} = -0.8593$),
- “It is pleasant for me” ($x_{14} = -0.8532$),
- interesting teaching ($x_{15} = -0.8418$),
- intellectually enriching ($x_{16} = -0.8101$),
- meaningfulness ($x_{17} = -0.8101$),
- “It can help me” ($x_{18} = -0.8096$) ad.

Similarly, the criteria included in Factor 2 are found to be significant, but with a coefficient of 0.086. The criteria found in this way in Factor 2 include:

- modern teaching ($x_{21} = -0.4398$) etc.

An overview of the results obtained according to further statistical processing

Similarly, to the social science subject, the following is also performed and calculated for Mathematics:

- difference of arithmetic means $|m_1 - m_2|$ (i.e. deviation from benefit),
- paired t -test of dependent variables, which through the p -value statistically confirms the significance of the difference between the mean values of the pair criterion - benefit,
- Cohen’s coefficient of size effect d , which also reveals the significance of the benefit - criterion difference,
- correlation coefficient r , which reveals the tightness of the benefit - criterion relationship.

An overview of selected obtained statistical characteristics is given in Table 15.

Table 15

Combination of criteria influencing the benefit of the subject in relationship “benefit – criterion” for mathematics

Criterion 1 = Benefit	Criterion 2	Difference $ m_1 - m_2 $	P-value	Null hypothesis $H_0: \mu_1 = \mu_2$	Cohen's coefficient of size effect d	Correlation coefficient r
Benefit $m_1 = 3.667$	“I enjoy teaching” $m_2 = 4.067$	0.400	0.148	Non-significant	0.271	0.630
Benefit $m_1 = 3.667$	“I like math. subjects” $m_2 = 3.833$	0.167	0.572	Non-significant	0.100	0.583
Benefit $m_1 = 3.667$	“Does not burden me” $m_2 = 4.567$	0.900	0.004	Significant	0.576	0.593
Benefit $m_1 = 3.667$	“Pleasant for me” $m_2 = 4.400$	0.733	0.016	Significant	0.466	0.561
Benefit $m_1 = 3.667$	Interesting teaching $m_2 = 4.167$	0.500	0.300	Significant	0.418	0.755
Benefit $m_1 = 3.667$	Intellectually enriching $m_2 = 3.700$	0.033	0.899	Non-significant	0.023	0.656
Benefit $m_1 = 3.667$	Meaningful $m_2 = 4.033$	0.367	0.216	Non-significant	0.231	0.483
Benefit $m_1 = 3.667$	Teaching “can help me” $m_2 = 3.900$	0.233	0.282	Non-significant	0.200	0.744
Benefit $m_1 = 3.667$	Modern $m_2 = 4.900$	1.233	0.001	Significant	0.775	0.480
Benefit $m_1 = 3.667$	Needed for the future work $m_2 = 3.767$	0.100	0.662	Non-significant	0.081	0.756
Benefit $m_1 = 3.667$	Inspiration teaching $m_2 = 4.400$	0.733	0.001	Significant	0.642	0.787
Benefit $m_1 = 3.667$	“I welcome the distension of teaching” $m_2 = 5.233$	1.567	0.001	Significant	0.767	0.260
Benefit $m_1 = 3.667$	“I have to study a lot” $m_2 = 3.300$	0.367	0.518	Non-significant	0.120	-0.635
Benefit $m_1 = 3.667$	Overall quality teaching $m_2 = 3.600$	0.067	0.813	Non-significant	0.044	0.474
Benefit $m_1 = 3.667$	“I understand of topics discussed” $m_2 = 3.800$	0.133	0.641	Non-significant	0.086	0.554

Note: number of respondents: $n = 60$

The results of the group of students as a whole show that students see the benefit of the subject slightly above average ($m = 3.667$). Very close arithmetic means (i.e. $|m_1 - m_2| \leq 0.400$, usually large p -value, small to negligible Cohen's coefficient of effect size $d < 0.5$) are based mainly on the following pairs of criteria:

- benefit - "I enjoy teaching" ($|m_1 - m_2| = 0.400$; $p = 0.148$; $d = 0.271$),
- benefit - "I like mathematic subjects" ($|m_1 - m_2| = 0.167$; $p = 0.572$; $d = 0.100$),
- benefit - intellectually enriching ($|m_1 - m_2| = 0.033$; $p = 0.899$; $d = 0.023$),
- benefit - meaningfulness ($|m_1 - m_2| = 0.367$; $p = 0.216$; $d = 0.231$),
- benefit - inspiration ($|m_1 - m_2| = 0.313$; $p = 0.109$; $d = 0.236$),
- benefit - "It can help me" ($|m_1 - m_2| = 0.233$; $p = 0.282$; $d = 0.200$),
- benefit - need for future work ($|m_1 - m_2| = 0.100$; $p = 0.662$; $d = 0.081$),
- benefit - "I have to learn a lot" ($|m_1 - m_2| = 0.367$; $p = 0.518$; $d = 0.120$),
- benefit - overall quality teaching ($|m_1 - m_2| = 0.067$; $p = 0.813$; $d = 0.044$),
- benefit - "I understand the topics discussed" ($|m_1 - m_2| = 0.133$; $p = 0.641$; $d = 0.086$).

It is worth noting the criteria where the null hypothesis of equal means is rejected, i.e. the p -value is $p \leq 0.05$.

- benefit - teaching "does not burden me" ($p = 0.004$; $d = 0.576$),
- benefit - teaching is "pleasant for me" ($p = 0.016$; $d = 0.466$),
- benefit - interesting teaching ($p = 0.300$; $d = 0.418$),
- benefit - modernity of teaching ($p = 0.001$; $d = 0.775$),
- benefit - inspiration of teaching ($p = 0.001$; $d = 0.642$),
- benefit - "I welcome the expansion of mathematics teaching" ($p = 0.001$; $d = 0.767$).

As further confirmed by the statistical evaluation, according to the size of the correlation coefficient r , we can trace a very close relationship between the benefit and some criteria (correlation coefficient $r > 0.600$), which includes:

- benefit - inspiration teaching ($r = 0.787$),
- benefit - need for future work ($r = 0.756$),
- benefit - interesting teaching ($r = 0.755$),
- benefit - "it can help me" ($r = 0.744$),
- benefit - intellectually enriching ($r = 0.656$),
- benefit - "I have to learn a lot" ($r = -0.635$),
- benefit - "I enjoy" teaching ($r = 0.630$).

For these criteria, in line with correlation theory, it can be assumed that a change in these factors will significantly change the perception of benefits. This finding is surprising the criterion of the difficulty of teaching “I have to learn a lot”, because according to the research it does not the negatively affect the relationship to Mathematics.

3.4.5 Discussion and analysis of results

Let us make another interpretation by discussion. First, compare the results for the Social Science subject and Mathematics in Table 16.

Table 16*Comparison of teaching quality criteria for social sciences and mathematics*

Significance of the criterion	Social Science subjects	Mathematics
According to the step method forward	<ul style="list-style-type: none"> • Meaningfulness • Inspiration teaching • “I have the opportunity to express my opinion” 	<ul style="list-style-type: none"> • Necessity • Inspiration teaching • “I welcome the expansion of mathematics teaching” • “I have to study a lot” • Overall quality of teaching • Intellectual enrichment • “I like mathematics” • “I understand the topics discussed”
According to the principal component method (PCM)	<ul style="list-style-type: none"> • “I enjoy teaching”* • Meaningfulness* • Teaching “is pleasant for me”* • Intellectual enrichment* • Need for personal development* • “It doesn’t burden me”* • Up to date 	<ul style="list-style-type: none"> • “I enjoy teaching”* • “I like math subjects”* • “It does not burden me”* • “It is pleasant for me”* • Interesting teaching* • Intellectual enrichment* • Meaningfulness* • “It can help me”* • Modernity*
According to the testing null hypothesis of equal means (p -value), and according to the Cohen’s coefficient of size effect d	<ul style="list-style-type: none"> • Meaningfulness • Intellectual enrichment • Teaching “does not burden me”** • Up to date** • Inspiration teaching** • Need for personal development • “I enjoy teaching”** • “I do not have to learn a lot”** • “It can help me” 	<ul style="list-style-type: none"> • “I enjoy teaching” • “I like math subjects”** • Intellectual enrichment** • Meaningfulness** • Inspirational teaching** • “It can help me”** • Need for future work** • “I have to study a lot” • Overall quality teaching • “It does not burden me”**
According to the correlation coefficient r	<ul style="list-style-type: none"> • Meaningfulness • “I enjoy teaching” • Intellectually enriching • “It is pleasant for me” 	<ul style="list-style-type: none"> • Inspiration teaching • Need for future work • Interesting teaching • Teaching “can help me” • Intellectually enriching • “I have to learn a lot” • “I enjoy teaching”

Note:

* negative factoring PCM with benefit

** “worse” mean values than benefit

It follows that evaluating the significance of individual teaching quality criteria in relation to benefits is not an easy task. Table 16 shows that each of the mathematical-statistical methods gives results both identical to the other methods, and specific, which can be interpreted completely independently. Nevertheless, a number of criteria match according to different methods, so from the original number of 24 only 8-10 of them can be selected, which are found to be the most important. Interpretively, it is also necessary to distinguish whether the given criterion plays a positive or negative role what is apparently seen from the signs of correlation and from worse mean values than the benefit.

The resulting Table 16 also makes it possible to thoroughly assess the difference in the teaching quality criteria between the subject of the compulsory theoretical basis - mathematics - and the subject of supplementary - presentation skills. It should be noted that both subjects are expanding theoretical and supplementary subjects, which do not incorporate into the category of specialised subjects at a technical university.

Now let us try to answer three questions asked in the introduction part, specifically: "What importance do students attach to individual teaching quality criteria?" we can answer by listing those teaching criteria that proved to be significant on the basis of statistical evaluation methods. They are: "I like teaching", "I like the subject", teaching "does not burden me", teaching is interesting, intellectually enriching, meaningful, modern, needed for the future work, "I have to learn a lot", "I understand the topics discussed", "I welcome the possibilities of expanding the teaching of the subject", "I have the opportunity to express my opinion" and, last but not at least, the overall quality of teaching.

On the second question "What criteria of teaching quality affect benefit the most?" it is possible to conclude, for both subjects, that there are the criteria: intellectual enrichment, meaningfulness, "teaching does not burden me", "I have to learn a lot" and "I enjoy teaching".

For social science subjects is also important criterion of modern teaching and need for personal development. In addition to all above, there is also an overall quality of teaching for mathematics, even though its teaching is difficult. Furthermore, in a negative sense, it occurs as a significant need to understand the topics discussed, the uninterestingness of teaching plays a role, the fact that teaching is "unpleasant for me", "I do not like teaching", "burdens me", "cannot help me" and is out of date, which means that students do not like math subjects. In terms of research findings, however, these are the criteria that affect the contribution.

The third question: "Is there a correlation between criteria and benefit?" can be answered that it exists. In this part of the evaluation is accentuated

the importance of finding some correlation. Thus, a change in a certain criterion can lead to a more significant change in the benefit of the subject. These turned out to be criteria such as intellectual enrichment and “I enjoy teaching”, which are common to both subjects. Furthermore, for the social science subject it is also a criterion of meaningfulness and “it is pleasant for me”. For mathematics also criteria the need for the future work, teaching “is pleasant for me” and the fact that students have to learn a lot.

However, let us also note the criteria that were rejected by the hypothesis of agreement of the equal mean (p -value), i.e. criteria that are not significant with benefit. They are for mathematics: teaching “burdens me”, “is uncomfortable for me”, is uninteresting, outdated, is not inspiring for me, and therefore students do not welcome to extended teaching of mathematics in general. The view resulting from this type of evaluation shows that a change in these criteria can also lead to a change in students’ approach to the study of mathematics.

3.4.6 Concluding remarks

The aim of the exploratory study was to find the most important teaching quality criteria that the most influence the benefits of teaching for students. In the case of social sciences and sciences, which at the University of Technology represent theoretical and additional dimension of the field studied, it is also undoubtedly useful to trace such criteria. In these subjects, criteria play a key role in perceiving the usefulness of these subjects in relation to the whole benefit for the students themselves.

It can be stated that subjects that are not directly related to the field of study, which students have chosen to study in the first plan, may give them the impression of a certain embarrassment associated with the mere need to complete them only due to the formal progression of study. This can strongly affect their attitude and motivation to study them. Therefore, it is very difficult for the teacher to design the teaching so as to convince students of the need for these subjects and at the same time cause the desired positive effect in benefits.

In conclusion, we reiterate the difficulty of mathematical and statistical evaluation and the choice of appropriate scientific methods in the processing of results, which seeks to trace the most important criteria of teaching quality in order to reduce the original 24 studied criteria to approximately 8–10 the most important of them. Being aware of all these problematic difficulties, let us recapitulate what the research has found.

Regarding a social science subject, students want to feel especially meaningfulness, inspiration, intellectual enrichment, the need for personal development and

the fact that the course can help students. If they do not get these values, students do not enjoy teaching, it is not pleasant for them, so they have the impression that it is not up to date, so they may not even want to learn a lot. But students appreciate that they can express their opinion in these subjects.

For a science subject, we would expect a closer connection with the technical field, and therefore a more accommodating appreciation of the importance of mathematics for technical studies. However, it turns out – perhaps somewhat paradoxically – that students would appreciate more if the teaching of mathematics was inspiring, interesting, necessary for the future work, intellectually enriching and could help students. Negative correlations prevail over these criteria, which is exacerbated by the fact that students do not enjoy teaching, do not like mathematics subjects, it is burdensome for them, not pleasant for students and they have to learn a lot.

However, they consider the teaching to be of general quality. This is, of course, due to the complexity of the study of mathematics, but there is an increase in the interconnection of mathematics with other technical disciplines and to think for teachers about the concept of the subject. Mathematics students are not sufficiently convinced of this internally, and therefore they often understand mathematics only as a theoretical but very burdensome subject unrelated to specialised subjects.

Let us summarize that students appreciate the most when the teaching is high quality, students understand the topics covered, teaching is interesting and inspiring, is pleasant for them, brings intellectual enrichment and is necessary for personal development. This can also be given by the personality of the teacher, which students can appreciate intellectually, professionally and humanly.

On the other hand, they often wish more use knowledge for future work that they do not feel sufficient. In mathematics, therefore, they often mention the lack of meaningfulness and inspirational teaching, the need to learn a lot, which in turn leads to the unpopularity of mathematics as such. With presentation skills, on the other hand, they welcome the fact that they do not have to learn much, but would like the teaching to be more up-to-date and inspiring.

An exploratory empirical study showed a view of students' perceptions of benefit and revealed the most important criteria of the quality of teaching. The obtained data can be used for feedback knowledge of educational reality. They can help teachers with a methodical approach to teaching. By revealing the criteria that students consider important, further teaching can be made more attractive, efficient and modern. This knowledge can contribute to greater benefits and, in general, to the joy of studying all these subjects.

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4

SELECTED ASPECTS AFFECTING KEY ACTORS IN VOCATIONAL EDUCATION

4.1

Key competences of a secondary school principal in the Czech Republic

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Introduction

The school principal is a crucial person in the school who is responsible for its development and the quality results of its students. In the Czech Republic, the public administration reform in 2000 led to the decentralisation of education from the state to regions, municipalities and schools themselves, which gained legal subjectivity in 2003. The autonomy of Czech schools, which is higher than in other OECD countries, especially in organisational, personnel, curriculum and financial agendas, has given their principals much more power and therefore responsibility, which is also anchored in legislation in the Education Act. School management, unlike corporate management, requires a more complex managerial perspective, as the school principal is not only the manager of the organisation but also a teacher, in the same position as some of their staff. School management requires an interdisciplinary approach, using knowledge from education, psychology, sociology, legal and economic disciplines, etc., in addition to general management knowledge. A secondary school principal must meet educational and experience requirements and, in the case of public schools, must acquire knowledge of school management by completing a course of study for school principals.

The aim of the chapter is to establish whether the activities carried out by the principals of the secondary school themselves belong to roles mainly related to strategic and conceptual activities, i.e. the implementation of the school's vision, and whether the delegated activities relate more to operational and administrative activities.

Research question: Which of the work activities is performed by the secondary school principals themselves, which are delegated to subordinate staff and what factors influence this?

The results of a survey of 240 secondary school principals in the country in 2021 confirm that the principal performs roles as a leader, manager and process executor. As a leader, they set the direction of the school and convince the staff of its correctness, as a manager, they ensure the achievement of strategic goals, and as an executor, they achieve set goals and complete tasks. Within these roles, they perform many work activities from the position of teacher, employer, economist, lawyer, psychologist, HR manager, etc. They are responsible for the smooth running of the school, which consists mainly of ensuring teaching and learning in terms of personnel and content. They carry out some of the activities themselves and delegate others to subordinate staff.

4.1.1 Theoretical framework

The reform of public administration in year 2000 led to the decentralisation of education from the Ministry of Education to local self-government units (regions and municipalities), which became the founders of selected types of schools. Since the year of 2003, schools have acquired legal subjectivity to strengthen their autonomy in the legal and economic spheres, and since 2005, with the introduction of framework educational programmes for individual levels of education, also in the pedagogical sphere, which is also anchored in legislation, in particular in the Act 561/2004 Coll., on pre-school, primary, secondary, higher vocational and other education (Education Act), as amended. Currently, the degree of school autonomy in the Czech Republic is the highest in comparison with other European countries. International comparisons show that the Czech Republic is one of the countries with the highest degree of autonomy of schools in organisational, personnel, curriculum and financial agendas, which puts strong pressure on their principals, as well as on the volume of their work and responsibility for educational results in schools (Federičová, 2019; Průcha & Veteška, 2014, p. 47; Trojan, 2011; Trojan & Svobodová, 2019; Vašátková, 2006, p. 5).

Autonomy of school became the process to equip school principals with decision-making powers in many areas that they did not have to deal with in the past. In addition to carrying out direct teaching activities, the school principal must be able to manage the school and take responsibility for its development. Schools as organisations are no different from those in business or manufacturing, but unlike companies, which often have a different manager for each area of their activities (CFO, CTO, production director, HR director, operations director, etc.), the school principal is often alone in their role and has to carry out a variety of activities. The school principal performs the functions of teacher, employer, economist, lawyer, psychologist, HR manager, etc. and is responsible for the smooth running of the school, which consists mainly of ensuring the teaching and learning in terms of personnel and content. They must manage and lead people, communicate, make decisions about the use of funds, seek additional financial resources, evaluate and reward staff and, last but not least, carry out direct teaching activities. All of these work activities and responsibilities are derived from legal regulations that the school principal must comply with in the performance of their duties. Some of the activities are carried out by the school principals themselves, while others are delegated to subordinate staff. A certain specificity of schools, as opposed to companies, is the ongoing process of education and training, which requires specific demands on their leadership, management and administration and is linked to the preparation of managers to carry out these activities. The problem for Czech school principals is the high administrative burden, which takes up approximately 40% of their time, making

them the first among other European countries. One of the most important activities of principals, pedagogical leadership, which affects the quality of teaching and educational outcomes, accounts for only 15% of their time. At the same time, teachers' professional development is closely linked to practice and technological developments, which places considerable demands not only on teachers themselves but also on the schools in which they work. Schools need trained and committed teachers, and at the same time they need the guidance of highly effective managers and the support of other leaders and middle managers (Adamec, 2019; Federičová, 2019; Kalous, 1997; Pol, 2007, p. 12, 14, 27; Veteška, 2011).

The new school principals are not sufficiently prepared for their position, and the Czech Republic lags behind the average of European countries in the proportion of school principals who were prepared for their new position before taking up the post. Of the 23 European countries, the Czech Republic ranks 21st, with up to 42% of Czech school principals not having been prepared for the role, compared to 12% of school principals in the other European countries surveyed. Aspiring school principals are expected to have the same knowledge and skills as their predecessors, to learn many professional skills in a short time and to provide support to colleagues while they themselves deal with day-to-day problems. In the area of professional learning, Czech school principals feel the biggest gaps and need for improvement are in the areas of human resources management (42%), financial management (41%) and providing effective feedback (37%). On the other hand, Czech principals are relatively well educated and prepared in the areas of legislation, school administration and principal responsibilities (Federičová, 2019).

The requirements for school principals are determined by legislation, in particular the Act 563/2004 Coll., on pedagogical staff and on amendments to certain acts, as amended, which stipulates that the school principal should meet the requirements for a pedagogical staff member, experience of a specified length according to the type of school and, in the case of public schools, must complete a course of study in school management within two years of taking up the post. This means that management training is not required by the legislation before taking up the post of school principals. Often, teachers who have no management skills become school principal and only acquire these skills through experience and the required management studies during their tenure. The school principal performs roles as a leader, manager and process executor, often moving from one role to another during the day. As a leader, they set the direction of the school and convince staff of its correctness; as a manager, they ensure that strategic goals are achieved; and as an executor, they achieve set goals and complete tasks (Ozmen & Muratoglu, 2010; Trojan, 2011).

The uniform part of the foreign country emphasizes the professional training of school principals, their lifelong learning, and the development and cultivation of their competencies. The management of organisations, including schools, has been significantly influenced by technological developments and other social changes that have taken place in recent decades. Schools also need to develop their knowledge management strategies in order to achieve effective learning. The school principal, and in particular the level of their competence, plays a major role (Leithwood, Harris & Hopkins, 2008; van Jaarsveld, Mentz & Challens, 2015).

While the need for effective leaders is widely recognized, there is much less certainty about which leadership behaviors are most likely to produce favorable results. (Veteška, 2013) For example, in the U.S. some mainstream university preparation programs may not consistently focus on leadership principles, so it has become more popular to develop their own leadership development programs. (Tingle, Corrales & Peters, 2017) Bush explored the theoretical underpinnings for the field of educational leadership and management, evaluated different leadership models and discussed the evidence for their relative effectiveness in developing successful schools. (Bush, 2004) In Poland, interest in school leadership began to grow in the early 21st century as the belief that the quality of leadership significantly influences school and student outcomes became widespread. It is increasingly recognized that schools require effective leaders if they are to provide the best education for their students (Tulowitzki, 2019).

There are a number of similar views on the education of principals abroad as in the Czech Republic, e.g. in the Russian Federation, the education of principals and other managers must necessarily reflect the ongoing changes in education and in society as a whole. (Lapina & Stuken, 2018) Also in Romania and the UK, the school principal needs to be comprehensively trained in many areas with sectoral overlaps, an expert in school management and teaching quality management with the ability to reflect on external influences on education. However, as there is no requirement for prior systematic training in school management, leadership, law or economics, the system has long been in the position of having experienced and certified teachers who are not prepared for the job of principal. The image of a democratic principle with a participative leadership style is more effective, people enjoy working, multi-task, are motivated to do their jobs, feel respected, valued and have high self-esteem, which can only benefit the school organization. (Bolam, 2014; Iurea, 2017) Dorczak states that there are many studies on the specific components of leadership development program incorporated into the curriculum to positively impact the competencies of school principals as managers. (Dorczak, 2016; Harrogate, 2015) Dorczak argues that there is a lack of detailed analysis on the professional development of

managerial competencies in the principal development process, which needs to be planned and organised as a long-term development process in different principal roles, and that formal courses and training support this process. (Dorczak, 2016) In Wales, the professional work, identity and recruitment of school principals is also analysed. There, the role of the school principal (note: in the UK, the school principal is the head of school) has been reoriented towards organisational professionalism and the professional framework for school leadership training has been revised (Connolly et al., 2018).

Campos-García and Zúñiga-Vicente describe Spanish educational organizations (high schools) and divide employee motivation into two sets of characteristics related to leaders: demographic (gender and age) and professional development (previous professional experience in the organization and training). For example, in New Zealand, in addition to the importance of the competencies of the secondary school principal, the role of the principal in establishing key principles for improving student learning outcomes is emphasized. (Campos-García & Zúñiga-Vicente, 2019) However, there is a global concern about the availability of appropriate professional learning for principals. (Service, Dalgic & Thornton, 2016) The shadowing/mentoring component of the program has enabled aspiring principals to gain an understanding of the complexities of the principal role by shadowing and mentoring experienced principals in a number of schools in New Zealand. In addition to providing them with a network of effective principals, their experience led to reflection on their professional development (Service, Dalgic & Thornton, 2018).

The quality of school leaders is one of the fundamental factors that significantly influence the quality of teaching and learning at all levels of the education system. It is important to optimise the training of school leaders and to identify the importance of the individual items of the school leader's competency profile and the needs and requirements of school leaders arising from their everyday practice. The competences of school leaders in the field of school management are divided into four spheres - strategy development, management of the pedagogical process, ensuring and managing the development of the school as an institution, and management and development of human resources. Attention should be particularly focused on training and professional development to improve and develop the appropriate key competencies that should characterise a good school leader. (Bitterová, Hašková & PISOŇOVÁ, 2014) Pol argues that it is important to understand how people reach the position of school leader, how they adapt to it, and how they continue in their career. At the beginning of their career, principals usually grasp most of the acts of management themselves, but later find that external support is needed and learn what competencies can be shared and with whom (Pol et al., 2013).

The situation in the Czech Republic is specific in that a newly appointed school principal must have a prescribed pedagogical education and teaching experience determined by the type of school they will manage in the future. However, as there is no obligation to have prior systematic training in school management, people management, law or economics, the system has long been in a situation where experienced and certified teachers may be placed at the school principals, but they are not prepared for the job of principal. In the preparation of future educational leaders, especially school principals, it is necessary to seek opportunities to link their theoretical training with practice in an authentic school environment. A newly appointed school principal may not be ready for the job, but is expected to be fully operational from day one. As a rule, they do not have systematic support comparable to that of, for example, an induction teacher or a mentor. (Trojan, 2011) It is a suitable combination of theory and practice, transforming knowledge into skills, acquiring and deepening the level of competence. In adult education, theoretical knowledge cannot be separated from practical application. This is also a way of eliminating the low level of practical activities in teacher education and management education, as described in international recommendations (Declining results in Czech education, 2010, online).

Linking theoretical training with practice in an authentic school environment that is capable of transferring management competences is in line with the professional profile of a graduate of the Bachelor's degree programme in School Management at the Faculty of Education of Charles University. In the course of studying this programme, students undertake the practical part of their studies in schools cooperating with the department, in the so-called departmental schools, which create conditions for verifying the acquired knowledge in practice and facilitate the process of converting knowledge into skills. It is a specific form of teaching, the so-called management practice, which allows the connection of the theoretical part of the teaching, distance activities, various forms of discussions and practical demonstrations directly in the school environment and is always focused on specific subjects of study (Theory and Practice of School Management, People Management, Law, Economics and Financial Management and Management of the Educational Process) in accordance with the curriculum, which helps managers on the way to their professionalization (develops students' professional competencies within the framework of reflected practice). The practical part is a tool to support the development of professional competencies of future, as well as current, school and educational managers, their self-assessment and student evaluation. It is necessary to support the reflective concept of practice, therefore the implementers (academic staff/lecturers/externs) of study programmes at the Department of Andragogy and Educational Management of the Faculty of Education of Charles University constantly reflect on the situation, evaluate international experience and also project their

knowledge and experience into individual areas of teaching. (Basic information about the study programme, online) Reflective practice is an important tool in a practice-based professional education environment, where people learn from their own professional experience rather than from formal learning or from practical experience through knowledge transfer. It is the most important source of personal professional development and improvement. It is also an important way of linking theory and practice. One uses information to add to one's existing knowledge base and to come to a conclusion and a higher level of understanding (Coulson & Harvey, 2013; Mathew, Mathew & Peechattu, 2017).

4.1.2 Goals and research methodology

The aim of the chapter is to find out whether the activities performed by the school principals themselves belong to roles related mainly to strategic and conceptual activities, i.e. the fulfilment of the school's vision, and whether the delegated activities relate more to operational and administrative activities.

Research question: Which of the work activities is performed by the secondary school principals themselves, which are delegated to subordinate staff and what factors influence this?

The achievement of the objective is based on a content analysis of professional literature, articles and legal regulations, from which 250 work activities and competences of a secondary school principal were identified and verified in a pre-survey survey conducted through the LimeSurvey application on a randomly selected sample of 18 secondary schools from seven regions in the Czech Republic. Vocational secondary schools of different types predominated (12 schools), the rest were grammar schools (6 schools). The return rate of completed questionnaires was 67% (12 schools). Based on the analysis of the results of the pre-survey, it was found that the individual items of the questionnaire were easy to understand and in spring 2021 the questionnaire was sent by e-mail to all secondary schools in the Czech Republic except for the pre-survey schools (18 schools) and departmental secondary schools (11 schools), making a total of 1,274 secondary schools out of a total of 1,303 secondary schools of all founders. The return rate of completed questionnaires was 19% (240 schools).

A research survey among 11 principals of departmental secondary schools from 3 regions (7 from the Capital City of Prague, 3 from the Central Bohemian Region, 1 from the South Moravian Region) in the form of a questionnaire (return rate 100%) and an interview with 11 principals of departmental secondary schools defined the key work activities of the secondary school principal and the possibilities of their performance, i.e. whether the principals perform them

themselves or delegate them. Data analysis was based on the calculation of relative frequencies (as a proportion of the total number of respondents).

4.1.3 Results and discussion

The results of a spring 2021 survey of 240 high school principals and 11 departmental high school principals point to key job activities of the high school principal that are mostly performed by the principals themselves. Respondents agreed that the key work activities of a high school principal include managing the school as an institution, caring for staff, managing the school financially, and monitoring legislation.

Managing the school as an institution

According to secondary school principals, the principal, as the statutory representative, mostly manages the school as an institution on their own (81%) and on a daily basis (82%). The school principal has to represent the school in various meetings at all times, which they do most often themselves (92%) and as needed (80%), according to secondary school principals. Representing the school also includes representing the school at official and unofficial meetings with partners and at public appearances, which secondary school principals say is most often done by themselves (95%) and as needed (83%). It is an individual matter for each principal which meetings and appearances they attend (e.g. meetings, conferences, school anniversary celebrations, etc.) (Table 17).

Table 17

Work activities that the school principal performs himself or delegates and how often they take place – management and representation of the school

Work activities	Who and frequency		
	Alone (%)	Shares (%)	Most frequent frequency (%)
manages the school as an institution	81	19	daily (82)
represents the school in external negotiations	92	8	as required (80)
represents the school in official and unofficial meetings with partners and at various public appearances	95	5	as required (83)

Source: Author results

Care for employees

School principals stressed that the most important thing in an organisation is the people, their leadership and their care. According to secondary school principals, the principals themselves usually conduct the advertisement for vacant posts (84%) and this is most often done on an as-needed basis (93%). Interviews with departmental school principals revealed that many of them often make selections based on recommendations.

According to secondary school principals, hiring new staff or terminating the employment of existing staff is mostly done by the principals themselves (98%) and as needed (95%) as staff come or go due to, for example, retirement, maternity leave, or job changes.

According to secondary school principals, the determination of the weekly scope of direct teaching activities for teaching staff is usually made by the school principals themselves (68%), and most often on an annual basis (56%) (Table 18).

The induction and adaptation of novice teachers is mostly a delegated activity (89%) and is most often carried out on an as-needed basis (61%), according to secondary school principals.

Communication in the school takes place between different target groups (staff, guardians, the founder, social partners, authorities, suppliers, etc.). The school principal as manager must set up optimal communication processes in the school according to the target group with which the employees communicate. According to the secondary school principals, they mostly carry out the setting themselves (77%) and most often according to the need (58%). According to the secondary school principals, the school principal communicates by various means (telephone/email/mailbox/in person) mostly on their own (89%) and as needed (56%).

Working with people can bring conflicts among staff in the organization, which are mostly resolved by the principals themselves (85%) and as needed (85%) according to secondary school principals. Related to this activity is staff misconduct, which secondary school principals say is mostly handled by the principals themselves (94%) and as needed (89%).

In the case of the activities relating to the conclusion of contracts of employment, agreements and the determination of staff members' workload, which, according to the secondary school principals, are mostly carried out by the school principals themselves (81 %) and as required (84 %).

Table 18

Work activities that the school principal performs alone or delegates and how often they take place – employment, staff management, communication and conflict resolution

Work activities	Who and frequency		
	Alone (%)	Shares (%)	Most frequent frequency (%)
recruits/dismisses staff	98	2	as required (95)
invites applications for the following posts	84	14	as required (93)
concludes employment contracts and agreements, determines workload	81	18	as required (84)
sets the weekly scope of direct teaching activities for teaching staff	68	30	yearly (56)
ensures the induction of new teaching staff and their professional adaptation	11	89	as required (61)
sets optimal communication processes	77	23	as required (58)
communicates with employees/legal representatives/social partners/offices/founders/suppliers (by phone/email/data box, in person)	89	11	as required (56)
resolves conflicts between employees	85	7	as required (85)

Source: Author results

Financial management of the school

In the area of school financial management, the principal's basic work activity is to draft the budget and submit it to the principal. As shown in Table 19, according to secondary school principals, this activity is mostly delegated by the principal (61%) and is most often carried out annually (62%). Related to this activity is the monitoring of budget implementation, which according to secondary school principals is mostly carried out by the school principals themselves (55%) and most often on a monthly basis (54%). According to secondary school principals, the school principals usually try to do it themselves (70%) to obtain secondary sources of funding as needed (78%). Obtaining additional funding sources is related to actively seeking grant and other funding opportunities. According to secondary school principals, this activity is mostly done by the principals themselves (63%) and as needed (73%). The school has to submit a management analysis to the founder. This activity is mostly delegated (72%), most often annually (27%). The management and disbursement of the various funds is mostly delegated (74%) and done as needed (53%).

Table 19

Work activities carried out by the school principal alone or delegated and how often they are carried out – school budget, other sources of funding, management and use of funds

Work activities	Who and frequency		
	Alone (%)	Shares (%)	Most frequent frequency (%)
proposes and submits the school budget to the founder	34	61	yearly (62)
obtains secondary sources of funding	70	24	as required (78)
presents an analysis of the management	25	72	yearly (27)
manages and disburses funds	16	74	as required (53)

Source: Author results

Monitoring and updating legislation

As Table 20 shows, keeping track of changes in legislation is one of the activities that secondary school principals say is mostly done by the principals themselves (90%) and most often as needed (47%).

Related to this activity is the study of case law and its application in school practice, which secondary school principals say is mostly done by the principals themselves (73%) and most often as needed (73%). According to secondary school principals, the majority of principals (88%) consult a lawyer on urgent cases, most often on an as-needed basis (86%). Using legal services at school may be an option for principals to avoid potential legal disputes.

According to secondary school principals, the basic legal documents issued and updated by the principals themselves most often (72%), and most often annually (41%), include school and grading regulations. Many schools publish this document on the school website. In addition, according to secondary school principals, the school principal usually issues and updates internal regulations, working regulations, organisational regulations, and operating regulations themselves (70%), and this is done on an annual basis (28%).

Table 20

Work activities carried out by the school principal alone or by delegation and how often they take place – legal matters

Work activities	Who and frequency		
	Alone (%)	Shares (%)	Most frequent frequency (%)
monitoring changes in legislation	90	10	as required (47)
studies case law	73	12	as required (73)
consults a lawyer	88	6	as required (86)
issue and update school and classification regulations	72	28	yearly (41)
issues and updates internal directives, working rules, organisational rules, operating rules	70	30	as required (28)

Source: Author results

The results of the research investigation point to possible ways of transferring work activities in management practice to students. In the case of the key work activities related to school representation and management, the most appropriate way of delivery is through interpretation. In the field of working with people, most of the work activities can be handed over in the management practice by interpretation, however, in the case of concluding an employment contract, agreement and defining the job description, the method of handing over by providing a sample document can be used. Financial management work activities can be transferred to the traineeship either by interpretation (obtaining secondary sources of funding, managing and drawing down funds) or by a model document (drafting and submitting the school budget to the founder, submitting an analysis of the school's management). Work activities relating to legal matters can be transferred to the traineeship by interpretation or by a model document in the case of regulations and rules.

4.1.4 Conclusion

The chapter summarizes the results of the authors' research investigation focused on the identification of key work activities and competences of a secondary school principal, as well as the possibilities of their performance (by the principal or a delegated person) and the activities that should be part of the transfer of experience of principals of departmental schools at management practices as part of the practical training of students of the School Management study programme to consolidate students' theoretical knowledge.

According to the results of the research, the following areas are among the key work activities of a secondary school principal:

- management of the secondary school as an institution,
- management and care of staff,
- financial management of the school,
- monitoring the legal framework of the school.

The survey found that the key work activities related to representation and management of the school (managing the school as an institution, representing the school in external negotiations and representing the school) are most often carried out by the school principals themselves and on a daily or as needed basis.

Work activities related to staff management (tendering, recruiting, contracting and defining workload, defining the weekly scope of direct teaching activities, communication and conflict resolution) are mostly carried out by the school principals themselves and most often on an as-needed basis. In the case of the induction and adaptation of new teaching staff, the activities are delegated by the school principal to subordinate staff.

Work activities relating to the financial management of the school are usually delegated by the school principal to subordinate staff (proposing and submitting the school budget to the founder, submitting the management analysis, managing and drawing down funds), who are often operational staff (e.g. economist, accountant, etc.), most often on an annual basis or as required. Only the raising of secondary sources of funding is usually left to the school principals themselves and as required.

Legal work is usually carried out by the school principals themselves (monitoring changes in legislation, studying case law, consulting a lawyer, issuing and updating school and classification regulations, issuing and updating internal regulations, working regulations, organisational regulations, operating regulations) and most often on an as-needed basis or annually for school and classification regulations.

In conclusion, the key work activities related mainly to the strategic and conceptual activities of the secondary school principal are mostly carried out by the principals themselves and most often on an as-needed basis. This is because they are the statutory representative of the organisation and are responsible for all the processes taking place in the school to achieve the school's vision. In the case of financial management, the school principal often delegates operational activities to subordinates (economist, accountant) who have more experience in this area, but retains responsibility. The induction and adaptation of new teachers is also an activity delegated mainly to experienced teachers with the same professional background. The possibilities of delegating work activities to management practice will be the subject of further research.

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4.2

Competencies of educators and pupils in the system of dual education

Peter Marinič, Ludmila Rumanová, David Vorel, Helena Zelníčková

Introduction

The preparation of secondary school pupils for the employment in their future profession represents an important part of the educational process within vocational education and training. In addition to teaching in general-education subjects, their professional education also takes place through theoretical vocational education and during practical vocational training. Pupils thus develop a wide range of competencies with the potential for use in their future profession. In the process of vocational training of pupils, a system of dual education is used as an effective form of organization of the teaching process, which systematically prepares pupils for future professions in the real business environment. Pupils are educating as future employees and their specialization is developed. In this sense, the key role of the competencies of educators can be recognized. Thus, not only competencies of teachers working in the schools, but also competences of instructors, lecturers, trainers, and other stakeholders in the units of economic practice are supposed to be developed. At present, elements of system of dual education are being integrated into the teaching at secondary vocational schools in the Czech Republic, and the first legislative steps are being prepared to enable the return of system of dual education to schools. In other countries, such as Germany, Finland, Bulgaria, Hungary, Cyprus or even Slovakia, the concept of system of dual education is already part of the education system, thus the experience in these countries can be used for inspiration. Therefore, we focus on the comparative analysis of system of dual education with emphasis on the competencies of educators.

4.2.1 Goals

This chapter focuses on the issue of the system of dual education in the conditions of the Czech Republic in particular. However, the analysis of this issue is based on broader social trends in many countries of the European Union. As the system of vocational education is a relatively wide area of secondary education focused on the preparation of future graduates on the labor market, we also describe the situation of the labor market in the Czech Republic and its trends. In this context, we analyze the necessary competencies of both, educators in vocational education, focusing on the competencies of educators in the dual education system, as well as the competencies that students should acquire in this education for their future employment. To focus the issue more broadly, we compare the situation and training opportunities for educators in the dual education system with selected Member States of the European Union.

The aim of this chapter is to characterize the competencies of educators in the dual education system and to compare the situation in the Czech Republic with selected Member States of the European Union.

4.2.2 System of dual education in the context of current demands of labor market

System of dual education as a concept is currently the preferred education system in most EU countries. The Czech Republic has so far involved elements of the system of dual education in schools through various activities (MŠMT, 2018).

Society has to deal with the Industry 4.0 initiative, which creates specific demands on the workers of the future and the education, especially vocational education and training. (Pecina & Sládek, 2017). It can be assumed that with the increasing influence of digitization and automation, the view of the required competencies of employees will change in a fundamental way (ESF, 2021). With new trends in companies, however, comes the requirement to educate their own employees in their own and real company environment. This drastically eliminates the unemployment rate among school graduates. A very desirable effect of education in a real environment is also the creation of work habits that future employers prefer (Navrátil & Janoš, 2018).

System of dual education as a modern concept of education of pupils of secondary vocational schools and apprenticeships is based on the principle that the pupils are educated at school and at the same time work in an enterprise where an employment contract is signed (Pospolu, 2015).

The pupils thus acquire knowledge at school and practical skills during the practice at the enterprise. *This concept of education is advantageous both for the pupil and for the enterprise* that educates the pupil at its workplace. The enterprise thus educates its future employees and thus reduces personnel costs during the demanding retraining of new employees. The enterprise that participates in the education of the pupils then also participates in their evaluation during the final exams, both in the practical part and in the oral part (Confederation, 2020).

Navrátil and Jaroš (2018, pp. 7–8) talk about the targeted specialization of pupils in an enterprise that will subsequently employ them after their education. The enterprise will thus determine the professions that are necessary for the enterprise and will educate future employees itself. *Pupils will thus be equipped already during the education with the competencies that are required for future job position.* For the whole education process of the future employee to be successful, future

employers must address secondary vocational schools and apprenticeships that are located close to the future employer and educate pupils in the required fields.

System of dual education thus makes it possible to fill such job positions that current employers prefer. *By translating pupils' vocational training into practice, the overall adaptability of graduates after entering the labor market is also improved.* The system of dual education is a logical solution to long-term complaints of employers pointed to the concept of vocational training in secondary vocational schools and apprenticeships. According to entrepreneurs vocational training is inflexible and pupils acquire many skills that are already obsolete and unusable in real practice (Hronová, 2020).

According to the Chamber of Commerce (2021b) *system of dual education will be able to respond more flexibly to the demand of the future labor market.* The Chamber of Commerce will try to implement digitization and automation in education, and a rising number of small and medium-sized enterprises within the national economy of the Czech Republic are already expected.

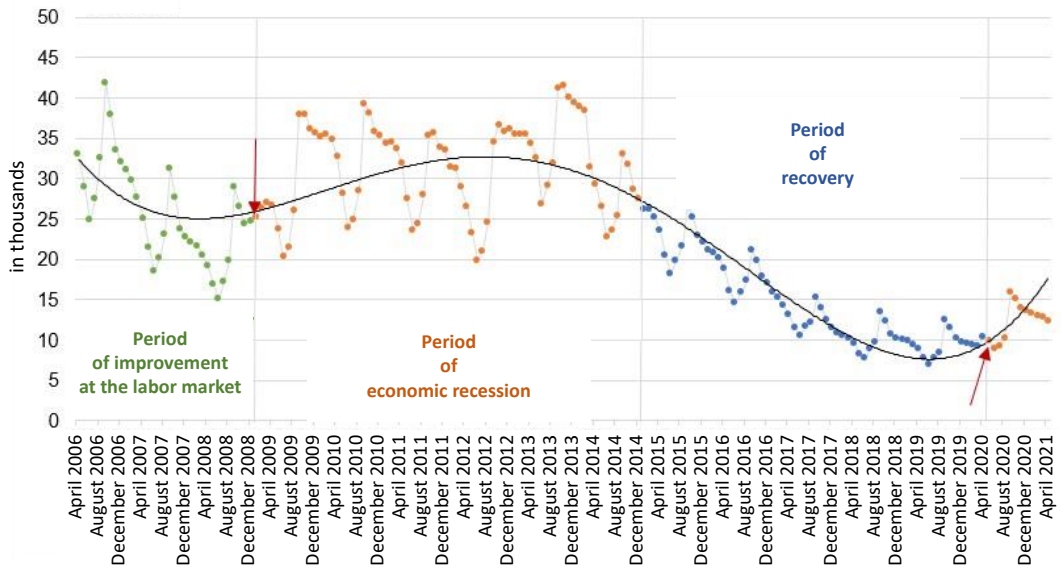
4.2.3 Recent graduates in the labor market

According to Vojtěch and Kaňáková (2015, pp. 8–11), *graduates of secondary vocational schools and apprenticeships are a vulnerable group on the labor market.* The authors describe a trend in which, after the main school holidays, there is an annual increase in unemployment among recent graduates of secondary vocational education. This trend is also confirmed by Vojtěch, Novotná and Zahradníčková (2021, p. 5). Recent graduates usually do not have the competencies that the labor market currently requires. The authors talk about the complete absence of work experience and insufficiently developed work habits of recent graduates in the Czech Republic. Thus, employers prefer to demand experienced workers on the labor market, who are less problematic for them.

Vojtěch, Novotná and Zahradníčková (2021, p. 6) describe that the unemployment rate in the Czech Republic is currently increasing among recent graduates of vocational education. While the unemployment rate in the adult population with work experience has a declining trend, graduates are experiencing the opposite trend. The development of unemployment between 2006–2021 among school graduates and adolescents, depending on the development of the economic cycle, is shown in Graph 22. Breakthrough years are indicated by red arrows.

Graph 22

Development of youth and school graduates' unemployment between 2006 and 2021



Source: Unemployment of school graduates with secondary and higher vocational education (2021)

According to Vojtěch, Novotná and Zahradníčková (2021, p. 6), the turning point is evident in 2008 and 2019, when a significant proportion of graduates chose the path of tertiary education and companies were threatened with labor shortages. Therefore, enterprises began to actively support vocational training through financial support to build technical facilities for schools or through professional excursions of pupils to enterprises and have also begun to take part in the vocational training of pupils. This finding confirms the fact that the *active participation of enterprises in the education and upbringing of secondary vocational school pupils increases the employment opportunities of future graduates.*

According to the findings of CEDEFOP (2020, p. 4), it is confirmed that the implementation of *system of dual education eliminates the number of unemployed applicants after graduation.* System of dual education in Germany is widely used as an example that shows the impact of system of dual education on the employability of graduates of secondary schools and apprenticeships. The unemployment rate among people aged 15-24 in Germany in 2019 was only 5.8%, while in the European Union, the unemployment rate in the same year among people aged 15-24 was 15.1% (CEDEFOP, 2020).

In the Czech Republic, industry accounts for 45% of GDP. According to the OECD Employment Outlook 2016 research, half of the jobs will inevitably

disappear or be significantly changed in connection with automation and digitization. However, with technological change, new professions will emerge that will be attractive to future generations. Due to the prediction of structural changes in the labor market, the transformation of the entire education system is inevitable. The OECD points out that 22% of workers are more qualified than the current employer requires. In contrast, 13% of employees do not have sufficient qualifications (OECD, 2016).

4.2.4 Implementation of dual education in the Czech Republic

In the Czech Republic not complex system of dual education is implemented. The Ministry of Education, Youth and Sports of the Czech Republic is working with the Ministry of Labor and Social Affairs of the Czech Republic to *implement chosen elements of system of dual education*. The Council for Vocational Education was established under the auspices of the Ministry of Education, Youth and Sports of the Czech Republic, which operatively evaluates priorities in vocational education in Czech education.

As part of the implementation of structural changes and the rapid introduction of priorities into Czech education, iKAP I – *Regional Action Plans for the Development of Education* was launched (MŠMT, 2018). The Action Plan (iKAP I) focused on priorities in the field of vocational education, which are directly related to the expected changes in the labor market in individual regions. The Action Plan (iKAP I) was established based on a government resolution, when the Ministry for Regional Development of the Czech Republic was instructed to submit an action plan which fulfilled the Strategy of Regional Development of the Czech Republic 2014–2020. One of the main priorities of the project was the implementation of strategic goals in education, including the development of partnerships between schools and businesses. An integral part of Action Plan (iKAP I) was the education of school management and schools' founders in connection with strategic planning. The follow-up Action Plan (iKAP II) is currently being launched and it should be implemented from 1. 9. 2020 to 31. 8. 2023. The main priority of the Action Plan (iKAP II) is “*support for career counseling and prevention of early leavers, literacy development, vocational and polytechnic education, equal opportunities and teacher further education*” (Jihomoravský, 2020).

As a further effort and implementation of system of dual education in schools, the Government of the Czech Republic has approved a new *Strategy for the Education Policy of the Czech Republic 2030+ (Strategy 2030+)*, which seeks to identify possible ways to develop and modernize education. *The Strategy 2030+ has two main objectives:*

1. Development of the necessary competencies for active, personal, and civic life for the future labor market in connection with climate change.
2. Eliminating inequalities in education and maximizing the potential of children development.

The implementation of the Strategy 2030+ will take place in three phases: 1st phase will take place from 2020 to 2023, 2nd phase from 2023 to 2027, and 3rd phase from 2027 to 2030. *The objectives of the strategy will be implemented within 5 strategic lines:*

1. Transformation in the content, method, and evaluation of education.
2. Equal access to quality education.
3. Support for pedagogical staff.
4. Increasing professional capacity, trust, and mutual cooperation.
5. Increasing funding and ensuring its stability.

At the end of the first period from 2020 to 2023, the success of the implementation of measures will be evaluated. These outputs will serve as support for the next period 2023–2027. The measures for the next two monitoring periods (2nd phase from 2023 to 2027 and 3rd phase from 2027 to 2031) will be elaborated in detail and will subsequently become an integral part of the Long-Term Plans for Education and Education System of the Czech Republic (Eurydice, 2021).

The Confederation of Industry and Trade and The Chamber of Commerce actively *support the implementation of system of dual education in the Czech Republic*, besides the Ministry of Education, Youth and Sports and the Ministry of Labor and Social Affairs. High percentage of secondary vocational schools and apprenticeships are interested in participating in dual education according to the Confederation of Industry and Transport (Confederation, 2020). The Confederation of Industry and Transport develops activities leading to the involvement of all secondary vocational schools, apprenticeships, and higher vocational schools in the system of dual education. The Chamber of Commerce of the Czech Republic (2021a) is also involved in recruiting quality teachers of specializes subjects to secondary vocational schools who do not lose contact with practice.

In 2017, a *pilot program of implementation of dual education system* within the Moravian-Silesian Region was launched, in which five secondary vocational schools and five companies participated. The main goal of the project was to describe the cooperation between the secondary vocational school and the company involved in the pilot project. The project was intended for secondary vocational schools with educational fields of category H (field of secondary vocational education with an apprenticeship certificate) and fields of category L (field of complete secondary vocational education with vocational training and graduation). The implementation of the pilot project was based on

the Memorandum of Cooperation in the Field of Dual Education, which was concluded between the Moravian-Silesian Region, the Confederation of Industry and Transport of the Czech Republic and the Ministry of Education, Youth and Sports of the Czech Republic on October 3, 2017 (MSPAKT, 2018).

The outputs of the entire pilot project will serve to implement system of dual education in complexity in other regions in the Czech Republic and to create legislation that will allow 10% of pupils to be educated in system of dual education in Czech Republic in ten years after the introduction of the system. Slovakia can be considered as a model for the implementation of system of dual education, where system of dual education has been successfully implemented in 2015 (Confederation, 2020).

The Chamber of Commerce, in cooperation with the Czech Association of Industry and Transport and the company Trexima, launched the *COMPETENCE 4.0 project* in 2021. The project focuses on finding out the *competencies for the future and on the creation of competence pyramids* for selected sectors of the national economy in the Czech Republic. Sectors of primary interest are cyber security, gaming (creative) industry, food industry, logistics, retail and wholesale or e-commerce. The main output of the project should be the innovation of educational fields from secondary vocational schools and apprenticeships to universities. Another goal of the project is also the innovation of retraining programs (Chamber of Commerce of the Czech Republic, 2021b). According to the Ministry of Labor and Social Affairs of the Czech Republic (MPSV, 2022), schools and companies in the Central Bohemian Region, the Ústí nad Labem Region, Moravian-Silesian Region, and Zlín Region are involved in the project. The project is also aimed to the implementation of elements of system of dual education in Czech education and the creation and maintenance of partnerships between secondary vocational schools and companies with the professional support from the project to both the participating schools and the companies.

In addition to the main activities implemented by the government of the Czech Republic or various chambers, *other support programs that aim to develop professional competencies of pupils* in vocational education are directly operated by companies. An example is the Prokop Diviš Incentive Program, which operates under the auspices of ČEZ Distribuce and focuses on pupils educated in electric engineering throughout the Czech Republic. ČEZ company strives to financially reward and motivate pupils for good education outcomes and motivates them to actively participate in various competitions or activities beyond their school responsibilities. The incentive program strives for equal access to education for all. In addition to the Prokop Diviš Incentive Program, ČEZ company has its own graduate program, where graduates are accompanied by a guarantor after joining the company, and who is their guide in their training in the company. In

addition, graduates can rotate between multiple departments. After two years of training, the graduate becomes an employee of ČEZ Distribuce (Schnepp, 2021). The professional competencies of teachers and other staff participating in the education of pupils in companies are also a key element.

4.2.5 Professional competencies of teachers and other educators in system of dual education

Competence means the ability to carry out a certain activity, whereas competencies do not only relate to the work of a teacher but are included in different professions. According to Petlák and Hupková (2004), competencies related to teaching work can be described as pedagogical-didactic competencies, sociological competencies, etc. Because the teacher not only educates, but also performs other functions within the educational process, whether teachers focus their attention on competencies, or they manifest and apply even without their active awareness by the teachers.

The teacher's competencies are necessarily focused on developing the required competencies of the pupils participating at the creation of the pupils' personality. The required complex of pupils' competencies is transformed into requirements for teaching and learning process and into teaching goals as well. Mastering them presupposes a well-prepared teacher. (Jakubovská, Jonášková, & Predanociová, 2016).

Identification of the teachers' competencies enables to affect pupils more comprehensively. The issue of teacher competencies is important in the system of dual education, especially in the training of pupils in secondary vocational schools, or in the implementation of vocational training in companies. For defining the concept and characterizing the meaning of competencies various definitions in the literature are available. Very few authors deal with the key competencies of Master of Vocational Training.

The teacher's competencies as a set of certain dispositions of teacher's knowledge and skills are consisting of special sub-competencies: vocational- and subject-competence, psychodidactic competencies, communicative competencies, organizational and managerial competence, advisory and consultative competence, and reflection of one's own activities.

According to the European Commission (Čellárová, 2010), it was proposed to divide the teacher's competencies into:

1. *Competences related to the learning process* (knowledge of the pupil's input characteristics and changing teaching conditions).
2. *Competences related to learning outcomes*, based mainly on key competencies for application in 21st century society – competences for active citizenship, European citizenship and sustainable development, lifelong learning, digital literacy, problem-solving skills, communication, cooperation, creativity and innovation, motivation to learn, competences to use ICT, work in a team, participate in school curriculum development and validation, competences of cooperation with parents and social partners (Kasáčová et al., 2006).

The pedagogical-didactic competencies of a teacher in general can be used to indicate the teacher's activities, which are implemented and observed mainly in the educational process.

Gozlinska and Sloska (in Salaty, 2001, p. 26) talk about the following competencies:

1. *Special competencies* – related to a specific year, subject, and school. The teacher completes these special competencies by participating in trainings, conferences, studying the relevant literature, etc.
2. *Didactic competencies* – acquired and deepened by a study focused on the management of the educational process.
3. *Psychological competencies* – enable the teacher to motivate pupils to learn, to create a positive atmosphere in teaching, to know and eliminate undesirable effects on pupils' learning, to develop communication in the classroom, etc. They also significantly affect the teacher's cooperation with parents.

Professional competencies in the system of dual education are necessary for assessing the work quality of masters of vocational education and instructors with pupils. The analysis of these competencies of educators are also necessary to design a training system to improve pupils' knowledge, skills, and attitudes in the workplace and school part of education comprehensively. The professional training in enterprises is carried out directly in the workplace under the guidance of masters of vocational education or instructors who are employees of the companies. They must have the required vocational education and pedagogical education in amendment, or at least the possibility to extend qualification by required pedagogical education. The school employs teachers – master of vocational education – who have already completed the specialized pedagogical education in the field of teaching practical training.

The professional standard defines the necessary professional competencies for the standardized performance of a pedagogical staff in three broadly grasped dimensions: oriented to the pupil, oriented to the teaching process, and oriented to the development of the teacher in the means of key and specific competencies development. The professional standard defines the qualification requirements,

defines a complex of demonstrable competencies – in the form of knowledge, skills, and attitudes – with indicators for the competencies to be diagnosed and evaluated. The national standard – for profession master of vocational education – sets out basic information (characteristics, regulations, certificates, required level of education, and professional experience). The competency model lists the required general competencies, professional knowledge, and professional skills.

The design of the structure of the *professional standard for masters of vocational education at the employer (instructors) and teachers of vocational education at school* is based on the proposed structure of the professional standard for the system of dual education, which were set according to the last year teacher training students survey (Čellárová, 2010) from the basic pedagogical skills listed in the key abilities of the teacher (Kyriacou, 2012) and the competencies listed in the work *Didactics of Vocational Training* (Krušpán & Volníková, 2007). The continuous career development of educators based on knowledge, skills, and attitudes development should also be considered.

The profile of the teacher of vocational education and training, master of vocational education, and instructor should be compatible with the stated and sketched professional standard. The profile respects the variety of experiences from the beginning of system of dual education implementation. It is obvious that teachers of vocational education at school have more experience with teaching practical training within vocational education than masters of vocational education or instructors in companies where the practical part of the system of dual education takes place. On the other hand, the masters of vocational education or instructors in the companies have more experience with the practical side of the production in real business environment according to the current trends with the use of the relevant technology. However, vocational education is a prerequisite for the position of master of vocational education, as a type of education with integrated vocational theoretical and practical side. The vocational education teachers in schools often desiderate the practical experience from real business environment and the masters of vocational education and instructors in companies desiderate the pedagogical preparation and experience.

The main goal of the vocational education is to provide the pupils with the appropriate knowledge and create environment to develop the appropriate skills. The vocational education teachers, masters of the vocational education, and instructor are supposed to prepare students for the profession after their graduation and be able to successfully apply for the suitable job position according to study field at the labor market. The pupil must have the necessary knowledge and competencies at the required level after graduation. The level of quality of education must be warranted at all levels to ensure pupils will meet a demanded requirements at the labor market. Reaching the suitable level of quality suppose the support from the public

administration in the form of practical help, manuals, job descriptions, registration and examination of masters of vocational education and instructors in companies, award for participating companies as the best practice example, inspection and control of all participants in system of dual education. The schools must ensure the quality of theoretical teaching in accordance with practice and provide cooperation between the school and companies.

The current time of significant changes in society requires from teachers of vocational education, masters of vocational education, and instructors a high degree of responsibility, activity, creativity, continuing further education, evaluation of the results of their own teaching activities and learning outcomes of the pupils.

4.2.6 The European Union's approach to vocational education and the implementation of the system of dual education in schools

The quality of vocational education is significantly influenced by the professional competencies of teachers of vocational subjects. Vocational education, resp. its quality is a great challenge for the education policies of all the member states of the European Union. In connection with the issue of the effectiveness of secondary vocational education, it is also necessary to address the professional competency of teachers of vocational subjects. To improve the quality of vocational education within the member states of the European Union, documents were created in 2016 within the *European Center for the Development of Vocational Training* (CEDEFOP) describing the support of vocational education teachers and masters of vocational education or instructors. The European Center for the Development of Vocational Training (CEDEFOP) was established in 1975. It is a non-profit organization, and its main task is to support and develop vocational training within the European Union. In addition to cooperating with the European Union and the *European Training Foundation*, it conducts research and analyzes that monitor the state of vocational education. *The main priorities include increasing the competencies of vocational education teachers, supporting lifelong learning, and monitoring the development of vocational education* (Kotasová, 2017).

The most important supporting element of quality vocational education is the cooperation of the companies and schools, resp. vocational education teachers in schools with the masters of vocational education and instructors in companies, which is characteristic for the system of dual education (CEDEFOP,

2016). Many documents and research have been published on the issue of vocational education including the document *Supporting teachers and trainers* (2016), published online by the European Center for the Development of Vocational Training, were used to compile an overview of system of dual education in selected countries of the European Union. Out of a total of 29 EU countries, we select six countries for analysis of characteristics of system of dual education and competencies of the educators that are specific in their approach to vocational education.

Teacher training requirements in **Hungary** are regulated by relevant law. The condition for teachers to be able to teach vocational subjects is a pedagogical education at a university or the equivalent of a university degree in another field. The legal measure in Hungary also allows the employment of teachers who do not have a university degree but meet the professional requirement, but preference is given to qualified teachers. Career system for teachers is established in Hungary and mentoring as a support for teachers. Instructors must have five years of experience in companies and must not have a criminal record. Instructors who are university-educated or over the age of sixty do not need to have a master's craft certificate. The master's exams are organized by the Hungarian Chamber of Commerce. (Bükki et al, 2016).

Bulgaria also has system of dual education implemented in its school system. Teachers of vocational subjects must complete a specialized bachelor's degree, but preferably a master's degree. Mentoring has been introduced to support teachers. Due to the lack of VET teachers, schools often use specialist consultations. The education of future teachers of vocational subjects is divided into three stages. The first stage consists of listening in the schools, then future teachers undergo continuous teaching practice and at the end they take part in professional internships in schools. Future teachers undergo a minimum of 48 hours of training according to law. Within the system of dual education, pupils are assigned a mentor (instructor) for practice in companies, who has at least three years of experience in the field and has completed special training within employer. Mentors are directly involved in the preparation and updating of curricula and the creation of didactic materials for teaching. (Kovachev & Ganova, 2016).

The system of dual education system is also part of education system in **Cyprus**. Vocational education of pupils takes for three years and is alternately realized in schools and companies. Teachers must have at least a bachelor's degree to teach vocational subjects. Seven-tier career system for teachers is being developed and mentoring is part of teachers' professional development. Each teacher must take part in professional training lasting 50 hours and then create their own portfolio in connection with their professional learning. Trainers and instructors

in companies who work with students do not need to have any pedagogical education. This is mainly because many companies in Cyprus are micro or private enterprises and employ up to five employees. A major issue is the quality of vocational education (Korelli & Mourouzieds, 2016).

Germany is the typical example of the country with system of dual education as a part of secondary vocational education. Vocational education teachers and instructors (Werklehrers) take part in vocational training. Vocational education teachers are further divided into teachers of vocational subjects and teachers of practical teaching. Vocational education teachers must have a master's degree. Teacher education organized in two stages. The first stage takes place at the university with a focus on pedagogy. The second stage, the vocational one, takes place at a secondary vocational school and partly in practice. Teachers thus increase their professional knowledge, skills, and practice. Instructors in companies must also have both professional and pedagogical knowledge. The minimum age for the position of instructor is 24 years, and in addition they must have completed a professional training course or have sufficient professional experience, which is verified by passing an examination. The professional competency of instructors in Germany is ensured by the relevant Chamber of Commerce, which keeps their records. The main task in German education is to increase the professional competencies of all participants who participate in vocational education. (Hensen & Hippach-Schneider, 2016).

The system of vocational education in **Slovakia** is more diverse due to existence of three directions. The first option is practical training in school. The second option is practical training based on an institutional agreement between the school and the company. The third option is the system of dual education. Practical training is provided in schools by vocational education teachers who have the status of a pedagogical employees. Teachers of vocational subjects must complete a master's degree in teaching and appropriate vocational education. Career system is established in Slovakia. Instructors in companies are not considered pedagogical employees but must have at least three years of professional experience and an apprenticeship. They must complete instructor training, which takes place in four modules with a total time allowance of forty hours (Vantuch & Jelínková, 2016).

Secondary vocational education in **Finland** is also based on a dual education system. Vocational education teachers and trainees have a well-defined range of activities with pupils. According to the findings, three quarters of the instructors have more than ten years of experience in the field. Instructors do not need to have any pedagogical education, yet they must undergo training focusing on the qualification needs of the instructor. Pupils in the workplace are evaluated mostly orally.

Finland is specific in that there is no accreditation for the teaching profession. In Finland, the training of vocational and general education teachers differs. Teachers of vocational subjects must first obtain a vocational education at least in the master's degree and then they can supplement their pedagogical qualification in the range of sixty ECTS credits. Teachers who do not have a master's degree can apply a minimum of three years' experience in the field. Teachers in Finland are motivated for further education. They can complete further university studies or take part in other supplementary qualification studies. Vocational teachers participate in the further education of professional practice directly in companies, where they update their professional competencies. The teacher education system is decentralized, so each vocational education and training provider can decide on the scope of in-service training for vocational education teachers and instructors. Finland is strongly focused on connecting school and practice (Koukku & Paronen, 2016).

Vocational training in the Member States of the European Union needs to be supported. Gender imbalance (predominance of women), but also the aging of professionals, is a current problem that affects vocational education across the Member States of the European Union. It is necessary to ensure enough professionals in the foreseeable future who would be interested in taking up the position of vocational education teachers. Existing teachers need to be properly motivated and given further in-service training so that they have up-to-date knowledge in the field.

4.2.7 Conclusion

System of dual education is a modern concept that follows the requirements of the modern labor market. There is a clear trend in EU countries that shows the need to link the real world of work and education. One of the main requirements of the labor market is the education of a future worker who will be educated and specialized throughout his life (OECD, 2016). Given the increasing influence of digitalization and automation in production and the prediction of the emergence of new fields, it is necessary for students to purposefully prepare for this role in the labor market from the beginning of their education. This is the only way to prevent the future problems of the current young generation with employability and adaptation in the labor market. In this way, the uncontrollable increase in the youth unemployment rate is prevented from the very beginning through pupils' education (CEDEFOP, 2020).

The educational system of the Czech Republic also partially responds to the trend of education in the real environment of companies by implementing elements of the system of dual education. In the future, changes in the basic curricular documents can be expected, which will ensure a complete transition to system

of dual education for pupils and students in the Czech Republic. However, the changes that must be implemented at all levels of schools must be systemic. They must be focused not only on the future competencies of the student, but they must also be focused on the future competencies of vocational education teachers, teachers of specialized subjects, masters of vocational education and instructors in both, the schools and the companies. Following the expected changes in the whole concept of the system of dual education, educators must be prepared on a long-term basis (Eurydice, 2021).

System of dual education thus makes it possible to educate the workers of the future who will be fully aware of their place in society and will respect the principle of sustainability of the human economy.

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4.3

Role of lecturer in the education of university teachers and the fulfilling of their educational needs

Jana Trabalíková

Introduction

We describe the varied roles and activities of a lecturer in the continuing education of university teachers. It concerns the education of teachers at the technical and economic faculties of the University of Žilina (further referred to as UNIZA) in the field of their pedagogical competences. Chronologically, we describe the preparation and implementation of education. We start with inspiration from the best technical and business universities and a list of essential attributes of a student and a teacher. Subsequently, using the specific results of the research on the educational needs of UNIZA university teachers, we describe our approaches to setting the content and selecting teaching methods. We share information on how teachers perceive the usefulness of training in selected areas of their pedagogical competences and what the activities of the lecturer are during the course. These efforts aim to contribute as much as possible to the course quality. In a broader context, this education gradually increases the targeting of UNIZA university teachers towards excellence in their teaching activities.

4.3.1 Theoretical background

We present a description of selected small steps that the University of Žilina (UNIZA), through the Institute of Lifelong Learning (ÚCV UNIZA), is taking in the context of *professional development of university teachers*. Within their competency profile, we mainly refer to the cycle of further education in university pedagogy. For practical reasons, we also refer to the term engineering pedagogy. In the chapter, we describe the activities of the lecturer and management of the ÚCV UNIZA during the selected three-year period. In the first and second academic year, the participants were university teachers of the technical and economic faculties of UNIZA who had enrolled in the course. In the third academic year, these were the university teachers working less than three years. In the latter case, completing the course was a job requirement. The participants of our courses are mainly *graduates of engineering and doctoral UNIZA study programmes without pedagogical education*. They can follow up this course with other workshops and activities through which the university creates a platform for the growth of the professional community of university teachers as education professionals. It ensures that not only junior teachers are supported to join these courses.

Before the implementation of the courses aimed at the improvement of university teachers in the field of the pedagogical activity, we planned the areas and topics carefully but also considered the suitability of selected teaching methods. In the beginning, it was inspiring for us to focus our attention on the *top ten technical and economic universities in Europe* with similar profiling. After analysing

the information from the websites and content analysis of the documents available, we found that even if particular systems differ, similar training is offered to university teachers in all of them. We can conclude that the improvement of university teachers in the field of pedagogical activity is most frequently coordinated by specific departments, institutes and centres. These are not parts of any of the faculties not even pedagogical faculties. *Teachers are motivated to participate* in these courses in different ways. Sometimes, teachers are formally rewarded by receiving an award for their active approach to teaching. In many cases, the course participation is compulsory for teachers to the extent influenced by the length of their pedagogical practice. They pay special attention to PhD students and university teachers at the beginning of their academic careers. If participation in courses is voluntary, various stimulating factors are created to motivate university teachers to develop in this area. These may include, for example, a requirement to submit a portfolio outlining the courses or training undertaken or to demonstrate the acquisition of a certain number of credits. Their role is to confirm the ability to teach the subject effectively. The university teacher candidate must demonstrate a willingness and ability to contribute to the continued growth of the department and possess a flexible approach to teaching and learning⁹ when applying for a job. *Universities thus demonstrate their interest in the continuous improvement of the education quality.*

Improvement in pedagogical activity has long been a natural and organic part of the preparation and work of university teachers in technical and economic study programmes, regardless of their scientific profile. *Excellent teaching* – including the development of the learner attributes – is the single most significant factor impacting on learners’ academic performance and personal growth that a school can influence. Successful schools and successful school systems, develop and nurture highly skilled teachers who are encouraged to be creative professionals working in a collaborative culture (Implementing, 2021, p. 40). According the learner/teacher attributes meaningful curriculum is more than a collection of different subjects (Table 21). Learners need to develop the academic abilities, life skills and attitudes needed to be successful in higher education and in the world of work. The purpose of this attributes is to support the development of five powerful and highly desirable learning habits that will inspire students to love learning and help them to lead fulfilled and successful lives. Students who have developed these attributes effectively manage their performance. See the example of a part of Cambridge university.

9 For example University of Cambridge Job Opportunities available from: (<https://www.jobs.cam.ac.uk/>)

Table 21*Learner and Teacher Attributes*

Attribute	Cambridge learners	Cambridge teachers
Confident	in working with information and ideas – their own and those of others, secure in their knowledge, unwilling to take things for granted and ready to take intellectual risks. They are keen to explore and evaluate ideas and arguments. They are able to communicate and defend views and opinions as well as respect those of others.	in teaching their subject and engaging each student in learning. Cambridge teachers know their subject well and know how to teach it. They seek to understand their students and their educational needs. They strive to communicate a love of learning and to encourage students to engage actively in their own learning.
Responsible	for themselves, responsive to and respectful of others. Cambridge learners take ownership of their learning, set targets and insist on intellectual integrity. They are collaborative and supportive. They understand that their actions have impacts on others and on the environment.	for themselves, responsive to and respectful of others. Cambridge teachers are highly professional in their approach to teaching, and they are collaborative and supportive. They understand that their actions will help shape future generations and they are concerned about the holistic development of every individual.
Reflective	as learners, developing their ability to learn. Cambridge learners understand themselves as learners. They develop the awareness and strategies to be life-long learners.	as learners Cambridge teachers are seeking to build on and develop their knowledge and skills. They support students to become independent and reflective learners.
Innovative	and equipped for new and future challenges. They are capable of applying their knowledge and understanding to solve new and unfamiliar problems. They can adapt flexibly to new situations requiring new ways of thinking.	and equipped for new and future challenges. Cambridge teachers are creative, experimenting with new ideas and pursuing an enquiring approach in their teaching. They are open to new challenges, being resourceful, imaginative, and flexible.
Engaged	and creative, experimenting with new ideas and pursuing an enquiring approach in their teaching. They are open to new challenges, being resourceful, imaginative, and flexible.	intellectually, professionally and socially, ready to make a difference. Cambridge teachers share their knowledge and skills with other teachers.

Source: adapted according to Cambridge Assessment International Education (Implementing, 2021, p. 40)

Crucially, foreign universities provide various methods of support for university teachers to continuously improve their teaching practice. The forms include courses on planning teaching objectives, effective teaching, testing and assessment of students, communication skills and career planning support. These have also been primary topics for us from the beginning.

4.3.2 University teachers at UNIZA

As mentioned above, designing the courses aimed at the university teachers' development in the field of their pedagogical activity, we searched for inspiration from renowned European universities. In addition, we researched the educational needs of university teachers joining the course and took the results into careful consideration. Thus, the practice-based thoughts, suggestions, ideas of university teachers and lecturers also significantly influenced its focus. The cycle of the course of engineering pedagogy was flexibly adapted each academic year to the specifics of teachers at UNIZA. In this context, we were also interested in the research of Blašková et al. at UNIZA (2014, p. 471). The outcome of the qualitative and quantitative survey was this final list of the *personality competences* of a university teacher:

- morally and ethically acting personality,
- professional personality,
- personality with valuable scientific effort,
- acclaimed author and honest personality,
- personality with excellent teaching competences,
- personality acting as a role model,
- mature personality,
- critically thinking personality,
- sophisticated and communicating personality,
- progressive, highly motivated and always motivating personality.

The attributes of a teacher and a learner described at Cambridge, the existing systems and experience of foreign and Slovak universities supporting university teachers in improving their teaching skills and also the description of personality competences of UNIZA teachers indicate that there is a need for continuous improvement of quality of teaching. The most crucial assumption for implementing the university education in line with the process, which creates values, stimulates progress and improves dynamically, is a continuously strengthened quality of the profile/skills and competencies of the university teachers. The teacher must improve the following qualities:

- science and research (using scientific efforts they must attract students and provide them always with correct, accurate, useful and inspiring knowledge),
- teaching (to be staunch professionals in the field of education),
- intra-personal qualities (understand one's mission as completion of one's personal qualities),
- inter-personal (educate in close participation with students, respecting their personality).

Combining the last two *competence clusters in teachers' profile* means a unique *intersection of personality competences* focused on oneself, i.e. personal competences of self-reflection, self-renewal, self-motivation and selfdevelopment with personality competences focused on other people – students, i.e. competences of inter-reflection, inter-renewal, inter-motivation and inter-development. In this area it is important to continually improve direct research and educational teacher's performance – to communicate and transfer knowledge, mediate and teach skills, and encourage/facilitate the development of competences of students and younger colleagues (Blašková et al., 2014, p. 474).

The purpose of the research at the beginning of a specific course was to determine the characteristics and needs of the trainees and to flexibly adapt the objectives and content to make them motivating for the trainees regarding the possibility of immediate application of the acquired knowledge.

4.3.3 Research survey methodology

In our selected measured indicators, we focused mainly on those that express the pedagogical erudition of university teachers and are manifested in their specific activities in interaction with the students. As outlined in the introduction and theoretical background, they are described in the literature and are part of engineering pedagogy courses and documents of the considered institutions. In particular, we selected those by which the university teacher creates appropriate conditions for teaching and learning.

The *research sample* consisted of all enrolled participants of the Continuing Education of University Teachers of Technical and Economic Faculties at the University of Žilina in three consecutive academic years – 2017/18, 2018/19 and 2019/20. We distributed the questionnaire electronically to respondents before the beginning of the course. The composition of the research sample is demonstrated in Table 22.

Table 22*Composition of the research sample*

Academic year	Participants (N)	Age	Questionnaire return rate (%)
2017/18	10	27-38	100
2018/19	16	26-49	68.75
2019/20	22	27-47	50
Sum	48	27-49	66.7

Source: documentation of the course Continuing Education of University Teachers of Technical and Economic Faculties at the University of Žilina (2017-20)

More female than male teachers applied for training based on their interests. The research was oriented quantitatively. We collected research data through a questionnaire of our own design. Respondents expressed the intensity of their subjective perception on a numerical scale for each item. The scales were evaluated using the average. We assigned coefficients from one to six to the individual scale levels and multiplied the obtained values by the coefficient – the number of respondents who marked this level (<http://www.e-metodologia.fedu.uni-ba.sk/index.php/kapitoly/posudzovacie-skaly/vyhodnotenie.php?id=i13p6>).

4.3.4 Results and Discussion

We investigated responses to the following research questions:

1. Do teachers subjectively perceive themselves more as teachers or scientists?
2. At what level do teachers subjectively evaluate a) on a scale from “1 – don’t know at all” to “5 – know very well” their current level and b) on a scale from “1 – useless” to “5 – useful” the usefulness of learning in the areas that we have prepared as the basic content of teachers’ further education in terms of fulfilling the pedagogical competences of university teachers? These included the following areas:
 - content analysis and selection of key concepts for course content,
 - effective setting of learning objectives,
 - motivating students for effective learning,
 - application of innovative teaching strategies,
 - use of ICT in the teaching process,
 - creating a conducive social and working environment for students’ work,
 - fair assessment of learning outcomes,

- self-reflection on the teaching process and work on your own teacher development,
 - guiding students in group work (projects, case studies, collaborative teaching, etc.).
3. What is the difference between the level of subjective assessment (level of self-perception) of the current level in these areas and the subjective perception of the usefulness of learning in them?
 4. What are the differences between the group of trainees, who enrolled on the basis of their own interest in the first two academic years and the group in the third academic year with the obligation to complete this training?

Our findings indicate that university teachers in 2017/18 identified more with their scholarly than pedagogical activities, i.e. their rating being 4.10. In the following academic year, 2018/19, university teachers perceived themselves more strongly as teachers, not scientists (3.27), and similarly in the subsequent year (3.18). This initial information is particularly significant because, in the first academic year, the applicants were teachers who expressed a strong interest in improving the quality of their teaching.

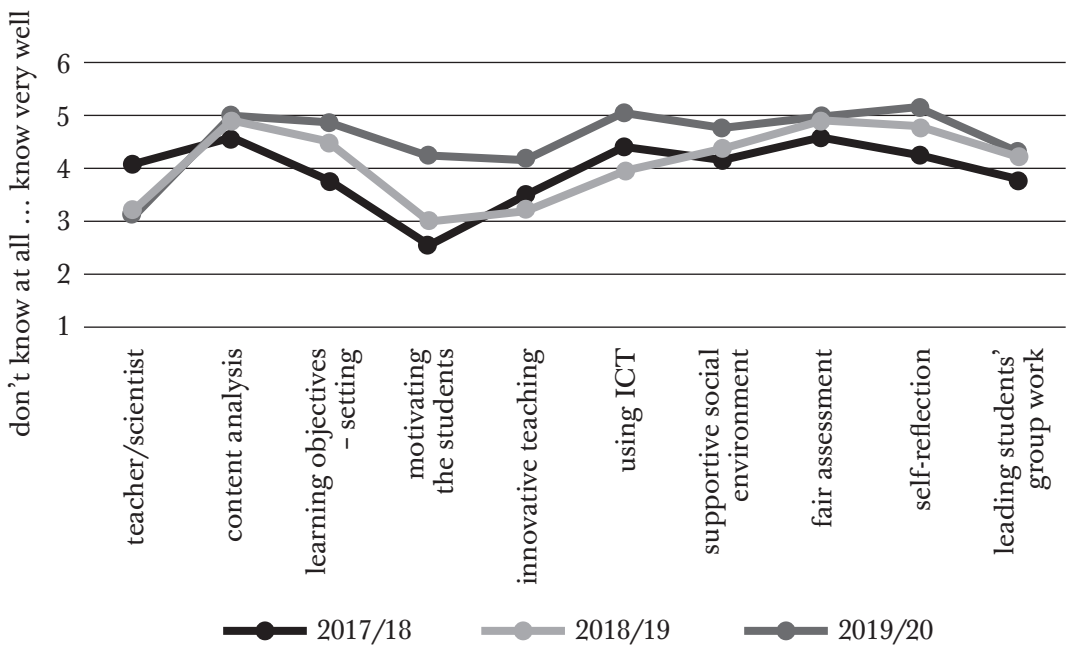
Comparing the academic years, the questionnaire results indicated (Graph 23) that the *self-assessment is highest* for respondents who took the course in 2019/20 as a requirement. This value explains the attunement of the group towards the obligation to complete the training. Some teachers expressed that they could handle the topics independently and did not need to dedicate time to training. Many engineering graduates indicated low motivation at the beginning of the training or could not state reasons to develop their teaching competences. The paradox is their shortest teaching experience compared to graduates in the previous two academic years. This condition is observed regularly by implementers of university teacher education at Slovak and foreign universities. According to Hrebeňárová and Trabalíková (2018, p. 121), the trainees themselves can only form their opinion after completing the training. Until then, the understanding of the area where university teachers - engineering graduates wish to acquire instruction exceeds the extent of their insight and expertise. Here, the theory of O'Connor-Seymour (1996, in Mužík, 2004, p. 33) can be applied in practice; he divided the adult learning process into four phases: 1. unconscious ignorance (I don't know that I don't know), 2. conscious ignorance (I know that I don't know), 3. conscious knowledge (I know that I know), and 4. unconscious knowledge (I don't know that I know).

If we focus on the comparison of the *self-assessment* of teachers (Graph 23), in 2017/18, the *highest* ratings were in the areas of analysis of curriculum content, selection of key concepts (4.6); fair assessment (4.6) and use of ICT (4.4).

The *lowest* ratings were observed in the areas of student motivation (2.6), use of innovative teaching strategies (3.5) but also effective management of student group work (3.8). In 2018/19, teachers' self-assessment was *highest* in the area of activities related to content analysis and key concept selection (4.9), fair assessment (4.9), and self-reflection (4.8). On the contrary, the *lowest ratings* were in the areas of motivating students (3.0) and using innovative teaching strategies (3.2). In 2019/20, the self-assessment of the current level of trainees was higher than that of trainees from previous academic years. Paradoxically, the ability to self-reflect (5.2), followed by fair assessment (5.0), and analysing the content of the curriculum with a selection of key concepts (5.0) rated *the highest*. However, these areas require longer-term pedagogical practice. Even these respondents rate their current level of practice lowest in the areas of using innovative teaching strategies (4.2), motivating students (4.3), and effectively leading student work in groups (4.4). On average, all three groups ranked *highest* in analysing curriculum content, selecting key concepts (4.84), assessing students fairly (4.84), and self-reflection skills (4.77), and *lowest* in motivating students for effective learning (3.29) and using innovative teaching strategies (3.62).

Graph 23

Self-assessment: entrance questionnaires between the years 2017 and 2020



Source: documentation of the course Continuing Education of University Teachers of Technical and Economic Faculties at the University of Žilina (2017–20)

The *level of usefulness* of training for respondents across academic years is reported in Graph 24. Overall, participants in 2017/18 *rated the usefulness of training at a higher level than their current level (self-assessment) in this area*. Here, they perceive *the highest* need for training, particularly in the areas of using innovative teaching strategies (5.6), creating a supportive social environment (5.6), analysing curriculum content (5.5), and motivating students (5.4). In the present academic year, we have dedicated the most space to topics related to the mentioned areas. We expanded the number of workshops focusing on current innovative strategies in university education. Moreover, we decided to use role-play (university teachers will be in the role of students) in these workshops more frequently. In this way, they will be able to actively experience what the selected strategy, method or technique provides to the student, will be more motivated to use its potential in their topics and better able to estimate the time it will require, etc. At the same time, this approach provides us with content to refer to, a basis for theoretical input when it is necessary to mention the theory of motivation, group learning, activation of students. At that point, they are only summarizing their actual experience. Teaching the course in this way activates the learner to think, bringing the live experience for the learner. We have also created space for the exchange of participants' experience with the implementation of innovative teaching strategies, presenting their good practice and evaluating their effectiveness under the title Didactic portfolio of university teacher and Training of methodological skills of university teachers.

In the academic year 2018/18, the areas of motivating students (5.5), using innovative teaching strategies (5.6), effective leading of student group work (5.6) and using ICT (5.5) were considered to be *the highest* in terms of perceived usefulness of learning. These findings were reflected in flexible modifications of the learning content. The respondents assessed the usefulness of training *higher* than their current level of expertise in all areas. In the academic year 2019/20, the areas in which teachers rated themselves *highest* were also the same in which they found it least useful to educate. *The most useful* training for them is in motivating students (4.00) and using innovative teaching strategies (4.0). In this sense, we have changed the learning outcome requirements from the course. We modified them so that the university teachers could demonstrate the implementation of knowledge and experience from the course into their teaching. The modifications included the presentation of their proposals with the mentor-trainer and self-reflection of their teaching activity based on previously identified observed areas. It was essential to select teaching methods that provided space for students to work in small groups and actively engage students in all the phases of the teaching unit. It was based on the premise that the lecturers also have to be careful in terms of the methods selected to achieve the learning objectives of their courses. The lecturer must consider that understanding cannot be transmitted

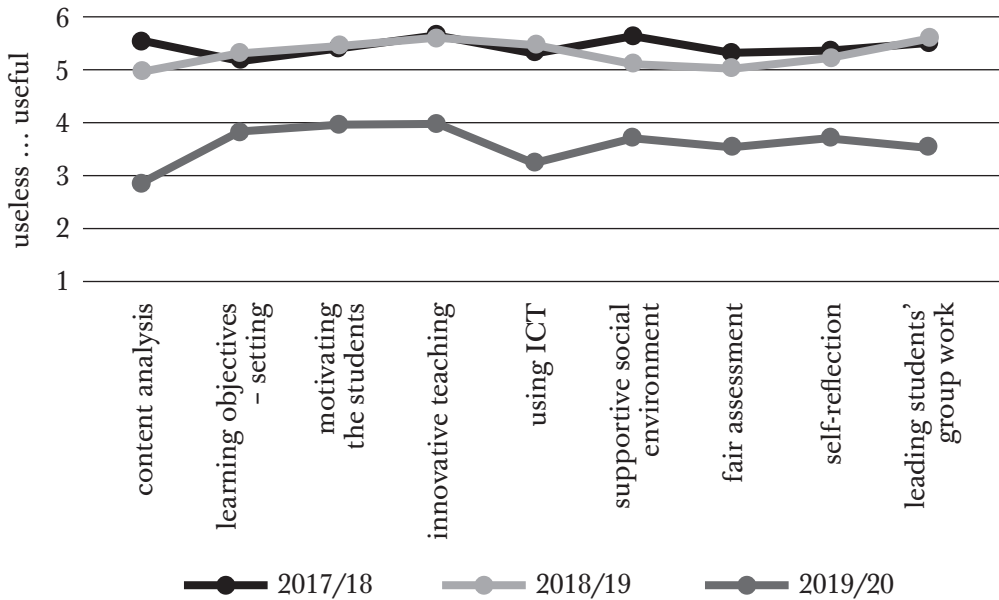
from one person to another; it is always constructed in learners' minds. In order to develop a learner's understanding, their existing mental models must be challenged and extended. The best way is to apply a collection of practices and principles, Cambridge International describes this as 'active learning'. The word 'active' refers to learners' being actively engaged in learning rather than passive recipients of teaching. Lecturers also need to be active leaders of learning rather than transmitters of knowledge or facilitators of learning (Implementing, 2021, p. 40). Despite this, Nilson (2010, p. 112) writes, that in fact, a few of the best teaching methods for helping students acquire high-level thinking skills can lower student ratings (for example, problem-based learning). Some students protest that the methods require too much work, lack sufficient structure, demand more independence than they can or want to manage etc. Some complain that they have to teach themselves too much and that their instructor is not doing her job. At the same time, colleges and universities are striving to serve and retain students. In this crunch, which should take higher priority: student satisfaction or student learning? These are issues that both lecturers of university teacher education and the university teachers themselves must face.

It is worth noting that the highest rating of the current level by the last group of respondents was also reflected in the lowest perceived level of usefulness of such training compared to the first two groups of teachers. While the level of self-assessment is on a scale between 4-5; the level of usefulness of being educated is on a scale between 3-4 in monitored areas.

Overall, all three groups found it most useful to improve their teaching competences in the area of motivating students, knowing and using innovative teaching strategies, creating a supportive social environment for students, effectively leading student work in groups, and self-reflection. See Graph 24 below.

Graph 24

Usefulness of education – entrance questionnaires between the academic years 2017 and 2020



Source: documentation of the course Continuing Education of University Teachers of Technical and Economic Faculties at the University of Žilina (2017-20)

In the questionnaire administered to university teachers, we provided them with space for their ideas, suggestions and recommendations for *useful areas* of their possible development. Specific statements from university teachers from all three academic years are presented:

Communication with students

- “communication in dealing with student assessment problems, their excuses and absences”,
- “resolving disagreements between students”.

Getting to know the students

- “assessment of important student personality characteristics”,
- “working and communicating with students with special needs”.

Student assessment

- “what is better: testing continuous knowledge or applying only a final test?”,
- “know how to assess students working in groups when there is a difference in their contribution”,
- “time-efficient assessment methods for large groups”.

Focus on innovative teaching methods, instructions

- “project-based learning, linking practice and theory, methods of activating students”,
- “group work, possibilities of using ICT, student motivation”,
- “arousing and maintaining students’ interest and attention”,
- “to teach students to think in broader contexts”,
- “How to conduct project-based learning and not spend the whole semester correcting assignments? How to motivate students to write the thesis continuously and not shortly before the deadline? How to explain a topic requiring math to students who are not good in math.”

Preparation of teaching materials

- “creation of presentations, examples and texts, production of teaching aids”,
- “creation of effective teaching support materials”.

Teachers’ work on themselves to improve the quality of their teaching

- “working with voice, intonation, building natural authority, time management”,
- “sociology, pedagogy, psychology”,
- “self-assessment”,
- “to be able to motivate students to self-education, to be able to schedule activities efficiently within the time of the exercises”,
- “mental training, systematic coaching and rhetoric”.

The topics that the university teachers at the Mendel University in Brno lacked were similar. In response to the question *What did you lack in terms of content in your course?* respondents were most likely to report that they would like to:

- “experience more practice and practical demonstrations of teaching”,
- “test individual teaching methods and forms directly in the subjects we teach in”,
- “discuss the good-quality and poor-quality video studies of on-camera lectures”,
- “have the possibility to consult their own teaching with a lecturer’s assessment”,
- “discuss some specific terms in greater detail” (Adamec & Kryštof, 2021, p. 3082).

The purpose of our questionnaire was to update educational content and to include the topics from the teachers. However, we could conclude that the topics proposed by us were in principle set appropriately. The next crucial step was the lecturer’s work on the content. This involved planning the specific 6-hour lesson and adjusting the topics so that the areas defined by the university teachers in the questionnaire were actually enhanced as much as possible. This happened on two levels:

- strengthening areas where university teachers' self-assessment was at its lowest level,
- strengthening areas where there was a need for training at the highest levels (which did not always correspond with the previous one),
- strengthening areas that teachers themselves suggested at the end of the questionnaire.

Directly at the lessons, we explained to teachers that we were dealing with particular topics because they were stated in their requirements or self-assessment. In this way, we strengthened their motivation to engage with this topic. If teachers are exposed to topics defined by their colleagues, these are more likely to capture their interest. approach provides them with a natural space for building a learning community together and some form of motivation and learning from coworkers. We consider learning from coworkers as highly significant. Workers learn from those more knowledgeable than they are, particularly if they have the same occupation; knowledge growth is more sensitive to more-knowledgeable coworkers than to less-knowledgeable coworkers (Jarosch, Oberfield & Rossi-Hansberg, 2021, p. 675).

At the same time, we let the university teachers know that we value their opinion and input and strive to meet their requirements and needs. In this way, we can meet the learner's expectations and make learning meaningful and motivating. Administering a pre-course questionnaire can serve several purposes. In general, it can lead university teachers to:

- see which topics the course will cover,
- make a self-assessment – the level of mastery within these topics,
- become more interested in topics in which they had some limitations,
- it will raise their expectations of the course they had to apply to,
- it may trigger conscious reflection on the course topics and their teaching.

It was essential for the lecturer *to meet the requirements* of the adult learners' motivation in the course, in particular by ensuring that not only the topics but also its specific content, the structure of the lessons and the teaching methods used were in line with them. According to Vašašová et al. (2016, p. 60), adults are motivated to learn when they see the result of their efforts in real-life situations where they immediately use the acquired knowledge and skills. An adult's motivation for learning is a factor that influences its final effect. Vašašová et al. (2016) describe the adult motivation for learning according to the benefits and gains it brings to the adult. Although this is a view in the older literature, we observe these attributes very strongly in our courses. The first factor in motivation to learn is *immediate profit*. It is the stimulation of interest in the subject

matter, topics by which the trainee may be attracted. It may be determined by the *refreshment of previous experience, knowledge, the personality of the educator*. Motivation for educated adults in our case can also be short-term profit. In this sense, it is significant to design education so that the participants understand that it meets their educational needs and *the acquired knowledge can be used in practice immediately after the lesson*. These conditions also apply to the setting of training topics so that they are always carefully aligned with the academic year's timetable. We managed this successfully as follows:

- In September, before the start of the winter term and contact with students, topics related to the professional growth of the university teacher, coping with the challenges of a rapidly changing work environment, preparing for teaching, first meetings with students, creating a syllabus for classes, learning about student characteristics are scheduled.
- During the winter term we include topics focused on getting to know the characteristics of a university teacher, setting the objectives of lessons, motivation of university students, activating teaching, communication with students – i.e. topics that university teachers can address in their courses during the current semester and do not require long-term preparation
- Before the end of the winter term, we include topics oriented to the examination and assessment of students, as these issues start to become significant for university teachers at this time
- Later, during the examination period of the winter term, we work mainly on the preparation of university teachers methodologically, in the area of using more demanding student-activating strategies, methods, teaching techniques, self-reflection and self-development in pedagogical activity
- In the end, they have the space to implement their knowledge from course into their teaching and then present this experience university or faculty representatives

The long-term profit from this cycle of learning is frequently noticed later. After a year or two after the course completion, we asked our training graduates to share their experiences with current trainees. Specifically, they were asked to identify what information they found useful. Similarly, we conducted qualitative research interviews with selected participants. Our experience is that short-term gains are more motivating for adult learners than long-term gains, as confirmed by Vašašová et al. (2016, p. 63).

However, there is also a second aspect of this fact. It is the long-term gains of education that all lecturers are requested to follow. Lecturers of teacher education *must be loyal to the university*, e.g. they should identify with the goals and values of the university, desire to belong to the university and are willing to develop for

the organisation (EuroEconom.sk, 2008). Each lecturer's approach co-creates the teacher's habitual motivation to learn. It develops a more permanent attitude (positive, negative) towards learning based on the individual's previous experience, manifested in behaviour towards learning. These attitudes also have a cognitive component associated with a rational evaluation in the sense of e.g. beneficial – not beneficial; an emotional component expressing an emotional relationship, e.g. I enjoy it, I like it/don't like it and a conative component based on openness to implementing the knowledge, learning experience or not (according to Vašašová et al., 2016, p. 63; Čáp & Mareš, 2007, p. 150). The lecturers are people who have to think intensively in a broader context and also focus on other benefits of education for the university as a whole, in addition to the idea of developing university teachers in their teaching activities. The idea is that at each meeting, *they contribute to the formation of a professional community of education experts* at the university who communicate about and share their experience in teaching students and are also prepared to develop in this area. A document published in 2017 by the European University Association – EUA's Learning and Teaching Initiative may also be inspiring. It identifies three specific recommendations that relate to promoting engagement in L&T development. We describe our experience in the context of the tutor's activities during the course (Table 23).

Table 23

Recommendations to fostering engagement in developing learning and teaching at university and lecturer's activities (adapted by the lecturer according to EUA's)

Group of recommendations	Recommendation of the EUA	Lecturer's activities within the course
Making teaching visible across the university	Honour teaching	provide opportunities to share examples of good practice; recognise innovative ideas, activities presented by teachers on the course; give examples of other UNIZA teachers' practice; notice teachers who are enthusiastic about teaching; always speak respectfully about the teaching activities of UNIZA teachers and students
	Value teaching	to talk in the course about the dimensions in which teaching at the university is valued compared to research; to talk about how to enhance teaching compared to research (which is a more significant criterion for measuring the quality of the university); to stimulate teachers to open their thinking for the future, as some of them will be faculty representatives in the future, and will be able to support the creation of tools that the university will use to strengthen the quality of teaching; to provide support in the preparation of their teaching portfolios
	Institutionalise support for teaching	mention that each university teacher's effort to excellence in teaching is part of a broader framework; help identify teachers at UNIZA who are excellent in teaching; invite these teachers to mentor those with shorter pedagogical practice; facilitate the presentation and implementation of selected creative initiatives by individual teachers in the faculties

Group of recommendations	Recommendation of the EUA	Lecturer's activities within the course
Forming a true partnership between teachers and students	Prepare for student-centred learning	to not only present the principles of the SCL approach to university teachers but also to implement these principles as an organic part directly into courses with university teachers; to use activity-based teaching in courses as a demonstration; to provide opportunities for teachers to empathise with students, e.g. role-playing; to apply learning theories and practices for effective learning at the course
	Build mechanisms to collect student feedback	to present tools for collecting and handling student feedback; to develop self-reflection of university teachers in the area of their pedagogical activity and to stimulate them to continuous professional progress in this area
Professionalising teaching	Promote scholarship of teaching and learning	to invite excellent teachers and experts in the field of education with respect to the current educational needs of the university teachers in the course
	Acknowledge teaching as a craft that needs hard work and practice	to use the context of different UNIZA teaching subjects in courses, workshops, interactive lectures
	Strengthen the programme focus	at university level
	Share practices and knowledge	stimulate teachers to create opportunities for informal and formal meetings to talk about teaching and how to make it more efficient at UNIZA

Source: according to Loukkola and Dakovic (2017, 2. 22)

4.3.5 Conclusion

The activities of a lecturer in the education of teachers at the technical and economic faculties of UNIZA in the field of their pedagogical competence include several partial tasks that must be implemented carefully. In addition, to define the concept of a learning organisation, it is necessary to establish the so-called *personal excellence*, e.g. to make employees aware of the need for continuous progress and self-education (Kachaňáková, Stachová & Stacho, 2012, p. 35). Those authors focused on education that ensures that employees have the knowledge and abilities necessary to perform their work appropriately. That means a need to focus on a complex approach towards education, on a so-called learning organisation whose objective is to reach permanent education. Their research demonstrated that the majority of these organisations let the employees manage their education individually. They do not seem to realise that in learning, self-education is suitable to acquire new knowledge but only to a limited extent, as *skills are adopted mainly in model situations*. The research also indicated that educational methods supporting learning through experiencing the given situation are used to a low extent. These situations with a link to specific learning content should be created by the lecturer. In adult education, *the competences of the lecturer are crucial*. We agree with Prusáková (2014, p. 3) that the basis of lecturing activity is, first of all, the lecturers' expertise in the subject area but, in addition to this, it also includes andragogical, social and cognitive competences, which are prerequisites for quality lecturing activity. The course quality is significantly influenced by the level of:

- andragogical competences of the lecturer related to the knowledge of adult learning issues, the content creation and the choice of learning methods,
- social competences related to the ability to communicate, cooperate, manage and make decisions while being emotionally flexible,
- cognitive competences based on structuring knowledge, creative thinking, self-assessment and self-knowledge.

Finally, we can reflect on many other *questions* that will be a constant challenge for lecturers if they wish to contribute to the quality of the courses for university teachers. How will the professional development of university teachers appear in the future? How will methods in university education change? What tools do we need to ensure that teachers remain innovative and efficient? How to contribute to the preparation of university teachers in terms of future-ready thinking? What kind of thinking, what kind of key competencies are required from university teachers and how to cultivate them? As the text above demonstrates, we are searching for answers but are aware that even the most valuable ones will have to be constantly updated.

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4.4

Selected contexts of the development of agricultural teacher training in the Slovak Republic

Tímea Šeben Začková

Introduction

Efforts to increase the quality of teacher training and the development of professional competencies cannot be achieved without a serious analysis of the determining factors, the previous and the current state. For this reason, the study focuses on a descriptive-analytical approach in terms of agriculture teacher training. The presented descriptive study is conceived as a longitudinal cross-section survey using the document analysis method. The study briefly summarizes the partial results that arose within the project “KEGA 033SPU-4/2019 The innovative curriculum concept and methodological “e-support” for the training of teachers of professional agricultural and food subjects”. As for the methods, both qualitative and quantitative research methods for processing data were applied. The chapter focuses on a brief summary of selected contexts in the development of vocational teacher training, containing a description of the change in the number of agricultural schools in Slovakia and the change in the number of graduates in teacher training for agriculture. Based on the mentioned areas, conclusions and proposals for the optimization of VET (vocational education teaching) teacher training are formulated.

Questions related to the preparation of teachers are a subject of theoretical reflection in the field of pedagogical sciences but also a part of formal frames and basic documents in the area of school policy on the national as well as international levels. The area of existing monographs, almanacs, studies in scientific and professional periodicals and other publication outputs is quite rich. On the other hand, it is questionable how comprehensive the research of this topic is when it comes to the preparation of teachers in individual study fields. Publications dealing with the preparation of teachers of academic (general education) subjects are the most common, which is understandable as these teachers form the most numerous group among the teaching staff, they find employment at primary and secondary schools and in the Slovak Republic, their preparation is facilitated by several teaching faculties as well as faculties focusing on philosophical studies and humanities.

The quality of professional preparation depends on the quality of regional educational systems and their teachers who are prepared by universities. The professional preparation of teachers is traditionally realised through teaching study programmes or in the case of non-teaching study fields, there is an option to acquire the teaching competence through supplemental pedagogical studies (SPS). In the case of secondary vocational schools, most teachers of professional subjects are graduates of non-teaching study programmes who had acquired their pedagogical competence through supplemental pedagogical studies. These teachers teach professional subjects (compliant with Regulation

No. 1/2020 Coll.) of theoretical education including practical exercises or laboratory exercises with the same content focus as their study field.

A high-standard of education in the area of agriculture along with educators who are well prepared to teach this topic have never been more necessary than today. The Earth's population is continually increasing and it is expected that in 2050 the planet will need to feed around 9 billion people. The agricultural sector will need to be able to produce enough quality food to sustain human life. The sustainability of the planet's development determines the sustainability of prosperity and the ability to provide a certain standard of living.

Teachers of agricultural sciences not only teach forestry, agricultural, food industry and other professional subjects but their mission should be broader. We are talking about steering students towards sustainable lifestyles, developing young people's agricultural literacy and building a positive relationship to the environment, etc. Their mission includes teaching pupils in the areas of agribusiness, which represents the management of a large industrial farm or a food-industry business, from the process of growing and producing to transport, in both animal and plant production, which provide people with various employment options and at the same time, produce food sources. In sciences such as chemistry or physics, pupils learn about fundamental processes that form the basic elements of each growth and every change in the country or among animals. At the same time, teachers must implement the latest technologies and knowledge from the area of technology into their teaching process. Teachers of agricultural sciences must incorporate all these areas and many others into their thematic plans and preparations for lessons in order to make the teaching of professional subjects dynamic and interdisciplinary.

4.4.1 Goals of the chapter

The main goal of the study is to analyse and evaluate changes in the training of agricultural teachers in the Slovak Republic in the context of socio-economic transformation processes and subsequent identification of critical elements of the educational system that require relevant transformational steps in order to maintain high-standard training for professionals in this sector.

Research question 1: How has the number of schools with agricultural specialisation in Slovakia changed since the 20th century?

Research question 2: How has the number of graduates in teacher training for agriculture changed?

4.4.2 Research survey methodology

Efforts to increase the quality of teacher training and the development of professional competencies cannot be achieved without a serious analysis of the determining factors, the previous and the current state. For this reason, the study focuses on a descriptive-analytical approach in terms of agriculture teacher training. The presented descriptive study is conceived as a longitudinal cross-section survey using the document analysis method. The text briefly summarises partial results that arose within the project “*KEGA 033SPU-4/2019 Innovative curriculum concept and methodological ‘e-support’ for the training of teachers of professional agricultural and food subjects*”. Data collection methods applied in the study were both qualitative and quantitative. Methods of data collection used analytical – synthetic procedures.

The chapter focuses on a brief summary of selected contexts in the development of vocational teacher training, containing the description of the changes in the number of agricultural schools in Slovakia and the changes in the number of graduates in teacher training for agriculture. Based on the mentioned areas, conclusions and proposals for the optimization of VET (vocational education teaching) teacher training are formulated.

4.4.3 Results and discussion

Changes in the number of agricultural secondary schools in Slovakia

If we attempted to assess the historical development of agricultural education in Slovakia from the earliest period until now and try to suggest possibilities for its future progress, we would find the result ambiguous. Strictly speaking, we cannot say if the current situation is the best, and there seems to be no clear answer to the question as the assessment depends on what we want to compare. For example, if we were to compare the educational level of the population, we would have to say that it has increased rapidly in the last one hundred years. In the early days of the first Czechoslovak Republic, secondary education was not available to everybody (like it is today), the network of agricultural schools has grown significantly since then, although there has been a certain regress in the last two decades. If we compare the material equipment of schools, we may say that it is the best in history. However, when it comes to comparing the forms and contents of teaching, the issue is not as clear.

The quality of education may be looked at from a different point of view as well: as early as the beginning of the 20th century, finishing secondary school (not

to mention university) helped graduates to find an adequate job. Nowadays, this is no longer the case, or only in the case of the best universities. University graduates end up in unemployment offices, which is something unheard of just a few years ago. Since the beginning of the 20th century, the number of secondary schools in the Slovak Republic has significantly increased and the same applies to the specific area of agricultural schools. The Table 24 presents a historical summary of agricultural schools compiled based on the document analysis of publications that dealt with the issue of agricultural education and preparation of teachers for the field of agriculture. The historical summary was processed by the author according to the following sources: Vontorčík and Šafáriková (1997); Kováčiková (1997), Demo (2001), Koncepcia odborného vzdelávania [The Concept of Vocational Education] (2014, 2018) and web pages of selected secondary agricultural schools.

Table 24

Numbers of agricultural schools in Slovakia in selected school years

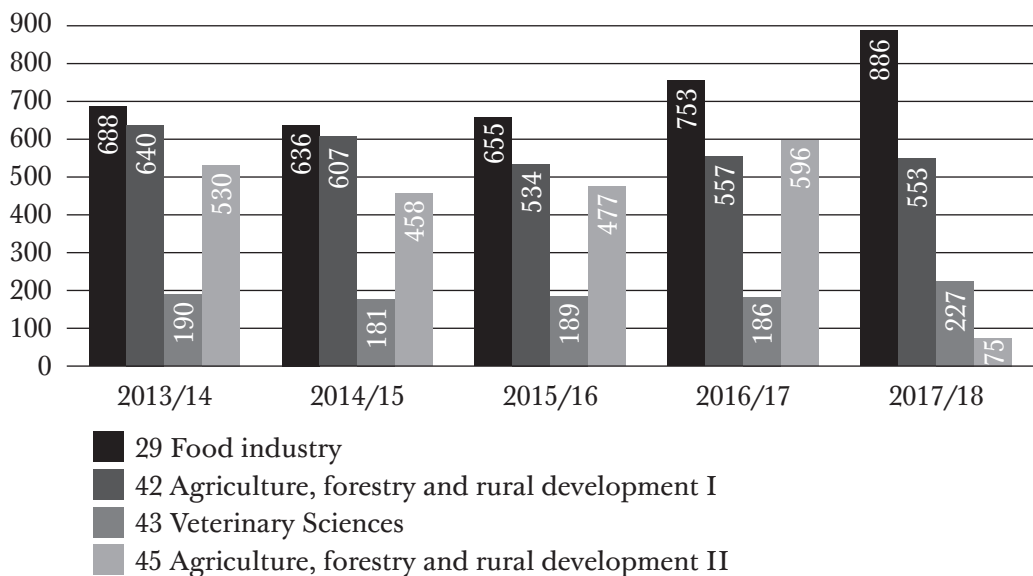
Year	1918/ 1919	1935/ 1936	1938/ 1939	1943/ 1944	1945/ 1946	2000/ 2001	2013/ 2014	2017/ 2018
Number of schools	9	29	30	25	22	112	101	106

Source: the author's own processing

As the Table 24 indicates, the number of agricultural schools has gradually increased since the end of the monarchy (1918). The largest growth was recorded during the period of socialist education development. Following the socio-political changes of 1989, during the transformation of the school system in Slovakia, the number of agricultural schools began falling but at the same time, the interest in food-related subjects grew (see Graph 25). In general, we can say that the number of students interested in agricultural education decreased after the year 2000, which resulted in the gradual phasing out and merging of schools.

Graph 25

Changes in the number of graduates of specialised secondary schools according to study programs



Source: CVTI SR (2019)

In the year 2013, the number of agricultural schools fell when compared with the year 2000. In the stated year, there were 101 specialised secondary schools offering studies in the fields of agriculture, food industry, forestry and veterinary sciences. Together, these schools were attended by approximately 9257 students. Most specialised agricultural schools were in the Prešov district (19), followed by the Trnava district (16), Nitra district (15), Žilina district (14), Banská Bystrica district (14), Košice district (10) and Bratislava district (7), while the Trenčín district had the smallest number of schools (6). Despite the relatively high number of agricultural schools, there was a lack of available labour force in the agricultural sector (The concept of vocational education and training of pupils for the performance of professions and professional activities in the resort of agriculture and rural development 2014).

In the school year 2017/2018, specialised education in the stated resort was facilitated by 106 secondary schools located in all districts. The specialised training in the fields of 29 - Food industry, 42 - Agriculture, forestry and rural development I, 43 - Veterinary Sciences and 45 - Agriculture, forestry and rural development II is currently realised mainly at specialised secondary schools, which represent 79% of all schools facilitating education in the stated resort. In the previous school year (2016/2017) the number of schools facilitating education in this resort was identical. Education in the resort is also provided

by private secondary schools. Currently, vocational education in the agricultural resort is facilitated by the following types of schools:

- joint schools – study programmes 29, 42, 43, 45,
- specialised secondary schools – study programmes 29, 42, 43, 45,
- hotel academies – study programme 29,
- vocational secondary schools – study programmes 29, 45.

In addition to vocational resort schools, agricultural and food-industry subjects are taught at hotel academies and special schools as well. On the one hand, we may say that the overall number of schools is higher today when compared with the year 2013, on the other hand, these study programmes are no longer offered solely by traditional agricultural or food-industry schools. Schools tend to offer wider career opportunities while spreading into the area of services; narrow profiling of graduates is no longer the trend. While speaking about the increased number of schools, the real numbers of students in particular study programmes are questionable. The number of schools may have increased but the numbers of students in given study programmes have not risen proportionally. This fact may be substantiated by the overall declining population curve not only in Slovakia but in other European countries as well.

The trend of declining numbers of students and numbers of schools in the agricultural sector is going to be described on the example of the district of Nitra. For example, the Specialised Secondary School for Services in Dvory nad Žitavou, established in 1969, was one of the schools afflicted by the 2019 closing of schools. For illustration, in the school year 1996/97, the stated school in Dvory nad Žitavou had 523 students in the fields of agro entrepreneur, agribusiness, electronic mechanic – mechanisation technics, farmer, mechanic – agricultural production (Vontorčík, Šafáriková, 1997). According to the Report on the educational activity, its results and conditions at the SSS – SzKI in Dvory nad Žitavou for the school year 2017/2018, the school had only 109 students. In the last school year 2018/19, there were just 34 students (according to polnoinfo.sk) and only 8 of them participated in agricultural studies. In the stated year, the school offered the following study programs: car mechanic – mechanic, confectioner, waiter/waitress, cook, farmer – farming (Kaliská, 2019). The stated example demonstrates the gradual changes in the number of students but also in the provided study programmes, which adjusted more to the interests of students, or their parents, than to the needs of the region.

As a result of the demographic curve, the decline in the number of students at specialized secondary schools is evident in the entire Slovak Republic, not only in the district of Nitra. This situation is confirmed yearly in the assessment reports of specialized secondary schools and it is also obvious from changes

in various indicators at specialized secondary schools (e.g. decline in numbers of new students, numbers of graduates, teachers, classrooms, schools) CVTI SR (2021). The situation should stabilize around the year 2020 and according to the prognosis of CVTI SR (2020), a slight increase in the number of students is expected by the year 2025.

Changes in the number of graduates in teacher training for agricultural education in Slovakia

The declining trend in the number of students studying at specialized secondary schools is reflected in the changes related to university studies for teachers preparing to work at these schools.

Throughout history, it is possible to observe various tendencies related to the number of students in the different forms of pedagogical skills acquiring. The development analysis can be traced back to the year 1964 when the Department of Education at the Higher School of Agriculture in Nitra (as it was then called) was established as a unique educational institution focusing on the specific teacher preparation for the area of agriculture. Until this moment, specific preparation of teachers for agricultural schools had been realized only in the form of seminars. Pedagogical seminars took care of the prescribed education, necessary teaching practice and pedagogic-didactic skills of teachers for all of Czechoslovakia. In 1927, The House of Agricultural Edification was established in Prague through which significant attention was paid to the preparation of teachers for agricultural schools, but it also offered agricultural counselling. In 1952, the Seminar for the Education of Teachers for Agricultural and Forestry Schools was established in Liblice, which operated nationwide. In 1957, the seminar was moved to Čáslav (Gnoth, 1993). The teaching seminar with a one-year full-time programme and two-year distance learning programme operated in Liblice, Čáslav and Prague and in 1960, the Bratislava branch was opened. This educational establishment which operated nationwide facilitated the groundbreaking preparation of vocational teachers until August 1964.

Since the establishment of the Department of Education in Nitra, the supplementary pedagogical study (SPS) has been the main form of training for vocational teachers. In 2002, a bachelor study programme was created at the Department of Education, which operated alongside other forms of SPS. The overall number of graduates in this form of study had only been 49 due to its limited time of existence.

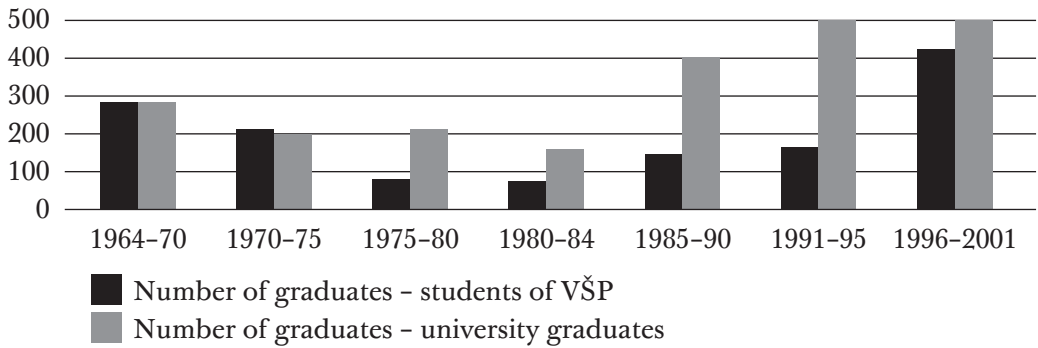
In the following analysis of the changes in the numbers of teaching study graduates, we have derived from a study of available archival material of the Department of Education at the Faculty of Economics and Management

of Slovak University of Agriculture in Nitra in various forms, from electronic sources through printed outputs and publications. The primary sources had been documents and reports on educational activities from individual school years and publication outputs from anniversary conferences of the Department of Education.

The summary of the numbers of graduates in both forms of SPS (full-time study for students and part-time study for university graduates) since 1964 is shown in the following graphs (Graph 26 and 27). The figures illustrate that until 1980, the numbers of graduates fluctuated, from 1980 to 2003 there is an apparent rising trend and since 2003, they have been falling significantly.

Graph 26

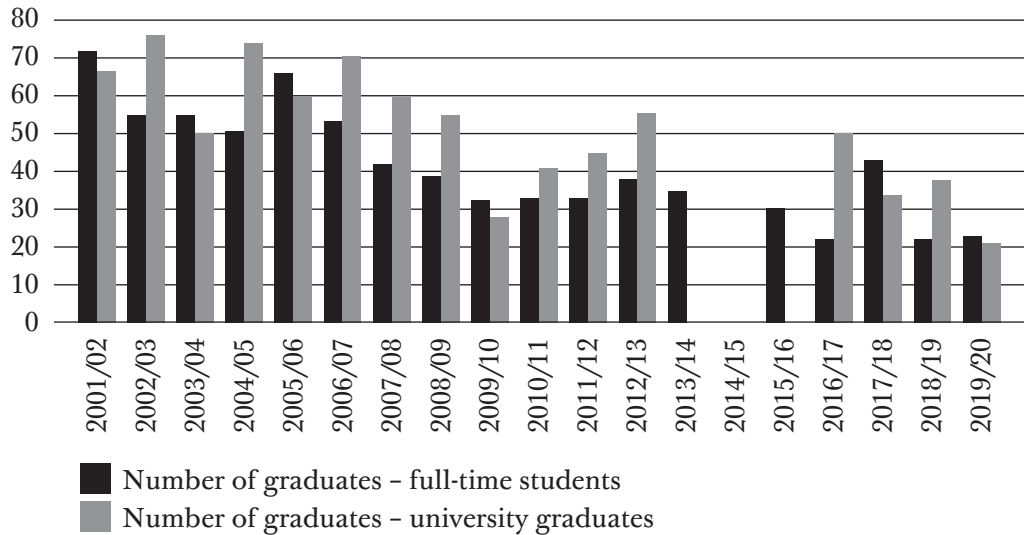
Comparison of the number of graduates of the full-time and distance forms of STS between 1964 and 2001



Source: author's own processing

Graph 27

Comparison of the number of graduates of the full-time and distance forms of SPS between 2002 and 2020



Source: author's own processing

To summarize the entire existence of the teacher training at SUA in Nitra (formerly VŠP), we may say that, although the forms of training have been changing, during the entire period in question, the school provided a full-time study combined with the master's degree study of the selected vocational field or a part-time study for university graduates. In general, we may say that in the entire period, the part-time study graduates outnumber the graduates of the full-time study despite the fact that since 1991, students have had to pay for this form of study, while the full-time study ceased to be free of charge in 2015. For the entire period, changes in the numbers of teacher training graduates primarily copied the Slovak demographic curve with the exception of the years 2014 - 2016. According to the secondary school development forecasts until 2025 "the number of teachers (full-time or part-time together) has been declining since 2002. Until today, it has fallen by one third from 19,000 to 12,600. The decline is expected to stop in 2020 at the figure of 12,400. Subsequently, it will grow, and in 2025, the number of teachers should reach the level of 13,600" (Herich, 2020, p. 25). In line with the stated facts, the summary of the number of SPS graduates copies the developmental trends of the number of specialized secondary schools' teachers, but at the same time follows the developmental trends of the numbers of secondary school graduates congruent with the demographic development in Slovakia.

The current status of agricultural education in historical as well as contemporary development has been determined by several factors.

One of the negative factors we might emphasise is the fact that the management and coordination of specialized secondary schools, first of all, lacks stronger professional cooperation with particular resort authorities and more significant cooperation with the praxis and universities. It is also important to point out that the preparation of experts in agriculture, food industry, veterinary sciences or forestry differs from studies at different types of schools and for this reason, it is necessary to maintain or renew the influence of the resort authorities and bilateral ties between agricultural schools and the praxis. The stated issue requires a sensitive and systematic approach to pedagogical theory, professional practice and the involvement of competent institutions.

Another factor that influenced agricultural education is the historical development of the agricultural sector in Slovakia. The stated has been criticised by several agricultural experts (for example, Julény, 2013; Fabian, 2013; Slavkovský, 2016; Golian, 2018 and others) who negatively assess the current state of the agricultural sector, which has been achieved by gradual liquidation following the transformation changes of the 1990s and subsequently after Slovakia has joined the EU.

Slavkovský (2016), for example, adds that not many political decisions in the history of agriculture had such devastating effects on its development as the first phase of collectivisation in the 1950s and de-collectivisation following the political and economic changes of the 1990s. Fabian (2013) states that after February 1948, the agricultural sector made bold plans based on educated agricultural experts. It took decades before poor agrarian Slovakia worked its way to the top of European agriculture thanks to its educated agricultural experts. Mainly after 1998 and following the country's accessions to the EU, Slovakia became one of the worst in Europe. The liquidation of agriculture was followed by the liquidation of the educational system with a focus on agriculture. Professions like agronomist, zootechnician and mechaniser became unattractive and will, in the future, have purely folklore value. Due to the agrarian policy of the EU, we started, according to the Fabian (2013), to take steps back and began "supplying the market with too many" farmers and agricultural land entrepreneurs, which makes sense only in a fragmented business environment and on 15-hectare farms with 10 dairy cows, 25 chickens and 4 pigs. Of course, small farmers have their value for the national economy and it is important to support them, but the state food policy should be based on large-scale production, which is something that, for example, the US agrarian policy is built on as is the case with other countries that dictate global trends (Fabian, 2013). Accordingly, Julény (2013) adds that from a state that in the specific degree of self-sufficiency was capable of covering 98.5 % of its needs (with crops for which we have good climate conditions), 93.4 % in the case of plant products and 102.9 % in animal products, Slovakia turned into a country dependent

on the export of food at the rate of more than 50 %. From the former 315,000 agricultural workers, we have downgraded to about 50,000 people employed in the agricultural sector. It is apparent that agriculture will never again employ 315,000 people also as a result of the technological progress, but it can employ tens of thousands of workers if the country's self-sufficiency increases to at least 80 % of our consumption and the ruined food industry revitalises along with stalls for cattle, fruit and vegetable warehouses, etc. Modern agriculture (as well as forestry) is not only about producing raw material but it is followed by the food industry and subsequent services, the educational system, research, etc. As Šmihula states (according to Julény, 2013), in developed countries, modern agriculture employs about 0.5–7 % of the working-age population. In Austria, it was 6.99 % at the end of 2010, in the Czech Republic 6.32 %, in Poland 16.25 % and in Slovakia 4.96 %. It turns out that we have a lot to do to catch up with, for instance, Austria. There is an often repeated myth that young people don't want to work in agriculture. The young people, however, don't want to work for wages that are significantly below the national economic average. As Sedlák (according to Pravda from 18 July 2013) states in his articles, if they are offered decent wages, even the young become interested (according to Julény, 2013).

Golian (2018) divides the reasons for secondary school graduates' lack of interest in the study of agricultural and food-industry programmes into reasons associated with the development of the structure of graduates after the year 1989, reasons associated with the departure of young people to study abroad and reasons associated with competencies of local school authorities and reduction of schools.

We may also mention the results of studies focusing on the inconsistency of education with the requirements of the labour market (PIAAC), which claim, according to Martinák (2016) for example, that the majority of qualification inconsistency in Slovakia (19 %) is caused by over-qualification. It means that almost one-fifth of all employees hold positions for which a lower level of education than they have would be sufficient. It is probably a result of a significant increase in the number of university-educated people in Slovakia, which grew faster than the number of jobs requiring higher qualifications. People with agricultural qualifications and qualifications in humanities, arts and languages have the hardest time finding jobs in their fields of study. On the other hand, people qualified in the fields of natural sciences, mathematics, IT, social sciences and agricultural sciences have a high chance to transfer their skills to other areas.

Departure of students to other countries can be illustrated according to the fact that a high number of Slovaks (it is estimated to be as many as 20 %) study at universities in the Czech Republic and almost 80 % of them stay there after finishing school. The other factor relates to the fact that the situation in the area

of agriculture and food production is not easy and that although the work is not as physically demanding and “dirty” as before, since electronization has reached this sector too, there is still a notable lack of interest among secondary school graduates to study these subjects. Another reason is that based on this disinterestedness, many specialised secondary schools had been closed. In the past, for example, there had been 5 dairy secondary schools in Slovakia, today there are none. There are almost no typically agricultural secondary schools, most of the time these are joint schools with a wide scope. This makes it difficult to open certain study programmes since secondary schools are under the responsibility of self-governing regional districts. If not enough students sign up for a certain study programme (for example butchery), let’s say in the district of Nitra, it does not open. But if the interest of students was coordinated within the whole country and pupils from other districts would have a chance to sign up, the situation could improve significantly. A different problem is caused by the fact that agricultural universities consequently accept graduates of non-agricultural secondary schools or secondary grammar schools who lack technical, agricultural or food-industry related educational backgrounds.

There are also tendencies to limit pedagogical competencies of teachers of vocational subjects in regional school systems by higher-level authorities, which may be illustrated as follows. Pedagogical competence of teachers of vocational subjects (according to Decree 1/2020 on Qualification Prerequisites...) when compared with the past (Decree 437/2009 on Qualification Prerequisites...) enables teachers to find employment almost exclusively at secondary vocational schools but on the other hand, agriculture is an area that relates to people’s daily lives. In the past, these teachers found employment also at lower levels of the educational system and could teach subjects like technical education, housework education or gardening. Although these subjects are gradually disappearing, or are taught sporadically or in a limited scope, we are convinced that it is the teachers of vocational subjects who will have more possibilities to find employment in the future. This conviction becomes even more urgent in the context of contemporary environmental trends; and as the issue of sustainability comes to the fore more and more frequently, new and more pressing needs surface in the area of education such as the need to educate consumers, form environmental awareness, develop people’s ecological and environmental literacy and others, for which the teachers of agricultural sciences are very well prepared. What’s more, these issues should be taught not only at specialised secondary schools but must form an integral part of the educational content at other levels of education and other types of schools.

When it comes to the training of agricultural science teachers, teacher education programmes should be revised and expanded to provide future teachers with

the knowledge and skills needed to provide meaningful teaching experience in agriculture (National Research Council, 1988 by Easterly, Stripling, Myers, 2018). In addition, the demand for agricultural literacy programmes for the general public is constantly increasing (Hughes & Barrick, 1993), leading to the need to revise curricula in the preparation of teacher programmes.

Subsequently, the influences described above lead to declining numbers of teachers of vocational subjects; this situation is caused by the education market's diminishing demand where teachers' possibilities of employment are shrinking, but also by declining numbers of students in higher education with subsequent declining numbers of students preparing for a teaching career. Of course, the issue needs to be viewed comprehensively, and we are aware that not only economic policy decisions have affected the current situation, but also decisions in the area of national school policy.

4.4.4 Conclusion

In connection with the above mentioned, the main goal of the study was to analyse and evaluate changes in the training of agricultural teachers in the Slovak Republic in the context of socio-economic transformation processes and subsequent identification of critical elements of the educational system that require relevant transformation steps in order to maintain quality training for professionals in this sector. The goal was achieved by a document analysis of various text documents. While assessing the situation in agricultural education, we derive from our findings but also from results of sectoral conceptions for the years 2014 and 2018. Conclusions related to the research questions of the study:

Changes in the numbers of schools with agricultural specialisation in Slovakia

- numbers of specialized vocational schools and numbers of graduates decline in general and so the trend in agri-food education is a declining one as well; this is caused by the demographic situation in Slovakia and by changes in the motivating factors related to the clients of the educational system.
- the situation is characterised by the rapid decline of students' interest in secondary agricultural, forestry, veterinary and food vocational schools, with the exception of some fields. There is generally low interest in the study of agri-food professions among young people, which also results in the low social prestige of the agricultural sector. Society sees the so-called „bread industry“ as lacking potential, physically demanding and poorly paid.

- the system of funding based on the number of students means that in many specialised secondary schools, the material equipment is poor, as is its technical condition, but it also leads to the merging or cancellation of schools for economic reasons. This funding system also means that schools are not motivated to care about the quality of their students and graduates but are focused on quantitative indicators.

Changes in the numbers of graduates in teacher training for agriculture

- Numbers of students and graduates in teacher training mirror the trends of the number of specialised secondary schools and their students.
- It seems that the training of vocational education teachers is a progressive and vital area, but on the other hand, it doesn't seem to be a priority of current political and economic interests.
- Numbers of students and graduates of full-time study programmes were significantly lower compared to the distance learning programmes.
- The existence of various forms of training for teachers of vocational subjects (teacher study programmes, full-time and the part-time study forms of SPS) but the dominant numbers are graduates in the form of SPS.

Conclusions connected to other factors influencing the agricultural education:

- Employment in agriculture is a problematic area since the average age of employees is high and the young generation is not interested in the type of jobs the sector can offer.
- In certain regions of Slovakia, there is a shortage of professional employment opportunities related to the current situation in the agricultural sector; certain regions signal a lack of agricultural labour force for some professions.

Based on the results and discussion, we propose the following recommendations for optimising the current situation in the field of agricultural education and related training of agricultural teachers:

- to improve and intensify the cooperation of central state administration bodies, professional organisations and employer institutions with secondary schools and educational establishments, to provide feedback on graduates' ability to find employment,
- to define the requirements of the labour market in the regions, identify the needs of the missing professions, define new occupations that create certain preconditions for employment in the sector,

- to facilitate the participation of the resort authorities in the execution of the state professional supervision over practical teaching, as well as the control of conditions and quality level of practical training,
- to promote the importance of agricultural professions; more attention should be paid by schools to the possible use of acquired knowledge and skills in rural development and rural business; it is important to use modern marketing tools for the presentation of agricultural vocational education in cooperation with the resort authorities, employers, public media, etc.,
- to develop the established network of schools and educational institutions in the sector, to stabilise existing schools, to enable students to access education directly in the region (regional centre) and to intensify the connection of agricultural secondary schools with the needs of the sector,
- to strengthen the stagnant situation in higher education in the Slovak Republic by developing professional field didactics for the agricultural sciences by using international experience and examples of good practice, to prepare publications with the focus on agricultural education in the national context, to build on the tradition of numerous research projects in the field of agricultural education and teacher training,
- to stabilise the numbers of students and graduates in teacher training for vocational agricultural education, to use modern marketing tools to promote the study of agricultural subjects, to increase the quality of teacher training, especially with an emphasis on practical needs of regional education by strengthening cooperation with teaching practice schools.

In conclusion, we want to draw attention to the fact that there are frequent changes in the teacher training for the field of agriculture, which also leads to frequent significant changes in the content of education. At present, however, the consequences of these changes and their impact on the quality of teacher training are not objectively assessed. As a result, we consider it important to always make sure that each set of changes in the educational content is followed by an investigation of their benefits. The results of this study can be the basis for the subsequent structuring of debates related to the direction of training and quality of teachers of agricultural education and the development of professional competencies in education.

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Koncepcia odborného vzdelávania a prípravy žiakov na výkon povolání a odborných činností v rezorte pôdohospodárstva a rozvoja vidieka 2014. http://radavladyp.sk/wp-content/uploads/2017/04/K_bodu_43.pdf

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SUMMARY

The collective monograph titled *Trends and Competencies in Vocational Education* follows the topic of contemporary vocational education and training within the framework of the so-called Visegrad Four. It contains a total of thirteen texts by various Czech, Hungarian, Polish and Slovak experts on vocational education. The topics of the book are divided into four areas. The first area, entitled *The Changing World of Vocational Education – Development, New Challenges and Opportunities*, contains two texts. One by the Polish author, Renata Tomaszewska, who concentrates on the issue of the fourth industrial revolution, Industry 4.0, and the resulting implications for the field of education; in particular, the transformation of competencies important for education and life in the following years. The author of the second chapter is the Hungarian author Lajos Somogyvári. In his text, he presents a historical perspective on the development of vocational education in Hungary. The second part of the book, with the title of *The Role of Developing Professional and Soft Competencies for Vocational Education*, contain three chapters. The first of them, by the Czech author Markéta Švamberg Šauerová, deals with building one's own social capital – the so-called life skills. At the same time, the author focuses on the integration of these basic life skills into a comprehensive system of competencies of pedagogical staff and presents selected techniques that can be used in teacher education. The second chapter of this part by Slovak authors Zuzana Geršicová, Silvia Barnová and Slávka Krásna presents research based partly on the method of experiment, which focuses on the area of development of personal and social skills in a broader context. The last chapter of this part of the book is written by Czech authors David Kryštof and Petr Adamec. The authors present a perspective on the development of teachers' competencies through the psychological approach of transactional analysis. The third part of the book, entitled *Approaches to the Sustainability of Quality Vocational Education in the Digital Age*, is devoted to the issue of digital competencies and digital technologies in vocational education. This part of the publication consists of four chapters. The introductory chapter by the Czech author Čestmír Serafín addresses the issue of digital literacy in the context of Czech schooling. Czech authors Kateřina Tomešková and Petr Svoboda follow up on this text with a chapter in which they deal with the issue of “reviving” teaching at a technically oriented university through modern approaches. The third text in this part of the book is a chapter by the Czech-Slovak duo of authors Pavel Pecina and Peter Marinič. The authors address the issue of the competencies of teachers of vocational subjects to prepare, implement and evaluate problem-based and research-oriented teaching against the background

of the ever-evolving conditions of digital education and artificial intelligence. The third part of the book concludes with a text by another Czech author, Jaroslav Lindr, who presents the results of his research focused on the quality of teaching in connection with the fulfilment of the key competencies of a technical university graduate. The last part of this collective monograph concludes with a topic entitled *Selected Aspects Affecting Key Actors in Vocational Education*. It contains a total of four chapters. The first of them, by Czech authors Eva Urbanová and Jana Marie Šafránková, concentrates on Czech secondary school principals. The next chapter was prepared by a Czech-Slovak team of authors Helena Zelníčková, David Vorel, Ludmila Rumanová and Peter Marinič. The main topic of their text is the integration of elements of the dual education system into teaching at secondary vocational schools in the Czech Republic as an effective form of the teaching process organization, which systematically prepares pupils for future careers in a real business environment. The penultimate chapters of this part, dedicated to the key actors of vocational education, approach the issue of diverse roles and activities of the lecturer in the context of further education of university teachers. Specifically, the Slovak author Jana Trabalíková further investigates how teachers perceive the usefulness of training in selected areas of their pedagogical competences and what the lecturer's activities are during the course. The fourth part, as well as the whole book, is concluded by another Slovak author, Tímea Šeben Zaťková, with a text in which she assesses the changes in the agricultural teachers' education in the Slovak Republic in the context of socio-economic transformation processes.

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