Teachers with Different Educational Background and Their Self-Efficacy

Martin Fico

Masaryk University, Faculty of Education, Department of Education

ABSTRACT

The presented text responds to the repeated opening of the topic of qualification prerequisites for the teaching profession. The aim of the work is to measure and compare teachers' self-efficacy among teachers with different educational backgrounds. The main research question is how preparation for the teaching profession is mirrored in teacher self-efficacy. The research sample in this study consists of Czech teachers ($n = 377$) with different educational backgrounds (teachers' educational programs from faculties of education, faculties of sciences, faculties of arts) also included those who have not pedagogical qualification (they have degree from university but not in teachers program). Quantitative measurement of teacher self-efficacy took place through the adapted Norwegian teacher self-efficacy scale (NTSES) for the Czech Republic, whose internal structure was verified by confirmatory factor analysis (CFA) and reliability measure by McDonald's Omega and Cronbach's Alpha. Statistical procedures used for data analysis were t-tests and ANOVA tests. The results in the text represent partial results from an ongoing research and suggest that teacher self-efficacy may be related to teachers' educational background and that Czech version of NTSES is fit to be used for another measure of teacher self-efficacy in the Czech educational environment. Bigger and more representative sample is needed for the further research for more evidence of possible effect of educational background to teachers' self-efficacy.

Keywords: adapted research tool, confirmatory factor analysis, NTSES, self-efficacy, teaching programmes, teaching qualification

Introduction

The Teaching Profession Now

Do we need teachers of quality, or qualified ones? This is the question Spilková & Wildová (2014) begin their post with. The question very much reflects the discussion over the past thirty years (not only) in the Czech Republic. There

are some reasons for why there is a lack of fully qualified teachers of good-quality in Czech schools: low prestige of the occupation felt by teachers themselves (Czech school inspection, 2020), high average age of teachers (Ministry of Education Youth and Sports, 2019), a high drop-out of young teachers (Ministry of Education Youth and Sports, 2019), and insufficient interest in the study of education (Korbel & Prokop, n.d.). All those possible reasons why there is a lack of high-quality and fully qualified teachers in Czech schools.

This particular problem is of different intensity in regions, in some of which it seems more critical than in others. It is also confirmed by heads of schools who took part in the TALIS research (2018). In the most critical region, up to 99% head teachers confirmed that the lack of qualified teachers is an obstacle for quality teaching (28% said to a great extent, 56% rather yes, 15% to some extent). In the least critical regions, up to 60% headteachers claim it is no obstacle at all.

The persisting absence of the teacher standard and unitary concept in the preparation of teachers does not simplify the situation. In the recent years, discussions on how to solve this situation in education have been opening again. Some suggestions focus on how to increase motivation for this profession (growth of salary, which has already been realised), however, some open the previous suggestions to lower demands of qualifications of teachers. Demands of qualification, quality preparation, and professionalism of teachers is connected to the problems mentioned above. Results from a research from Poland may be a warning. There are even such opinions in the public that everyone can teach for the reason that everyone has children, therefore they are able to do such a job (Smak & Walczak, 2017).

What does it mean to be a qualified teacher, though? According to the Act No. 563/2004 Collection of Law, a qualified teacher is a graduate of an MA teaching program, or a different MA study programme and additional pedagogical education. The qualification demands then count on teachers having gone also through education in psychology and pedagogy, which is considered to be an essential premise for the quality of teaching (Wiliam, 2018; Salman & Adeniyi, 2012; Machingambi et al., 2018).

Options of How to Become a Teacher

In the entire section I will present acquiring qualifications for teachers at lower secondary schools (6th to 9th grade).

Preparations of Teachers at Universities

According to the Act No. 563/2004 Collection of Law, a finished BA programme in education is not sufficient for a graduate for the teaching profession. It is not until finishing an MA programme that a graduate is allowed (qualified) to teach.

One option which is preferred (by the Act No. 563/2004 Collection of Law) to acquire the qualification for teaching is to study a programme of education at university. These programmes are mostly offered at faculties of education, but not exclusively (usually also at Science, Sport, or Philosophical ones). Faculties of Education usually offer BA programmes in which students choose a programme or two focusing on education. During their studies, they go through courses of their chosen programme, didactics of their study programme, pedagogy, psychology, and often also some practice at schools (e.g. as an assistant of a teacher). Different faculties have different courses, amounts of lessons, or compulsory practice, and due to the absence of obligatory standards, the differences can be tremendous. The absence of standard can also be observed at other faculties which offer BA programmes focusing on education. Pedagogy and psychology, sometimes also didactics, are not studied in depth as focus is on knowledge of their study programme.

MA study at faculties of education usually offers lower secondary education programmes, or lower secondary and secondary education programmes. The study also consists of courses of the chosen programme, pedagogy, psychology, didactics, and practice at schools. Basically, the same option is offered at other faculties which have accredited programmes for teachers, but they usually focus on education for secondary schools. As with BA study programmes, MA programmes are also different one from another at different faculties or universities, which results in possible situations of two teachers of the same programme from different universities not having the same knowledge. Finishing an MA programme of education makes a graduate qualified for the teaching profession. The system allowing this has been criticised by many experts (Spilková & Dvořáková 2004) for a long time. The problem lies in the fact that, acquiring the qualification to teach is available to any graduate whose BA study programme did not even focus on education and whose MA programme contained only minimal amount of pedagogy and psychology courses, which is at complete odds with the aims to professionalize this profession.

Alternative Joining of Profession

According to the Act No. 111/1998 Collection of Law, universities in the Czech Republic can also accredit courses in life-long education. These courses can also lead to acquiring qualification to teach (Act No. 563/2004 Collection of Law). The courses are for MA graduates of all programmes who want to (or have to) supplement their teacher qualification. The courses usually take two to three semesters and take place mostly at the weekends so that even full-time working students can join them. After finishing, a student should have knowledge of basics of pedagogy, psychology, didactics, and should have had some practice.

A person teaching without having gone through one of the above described options does not meet the requirements of qualification. How is it possible then that there are such teachers? Act No. 563/2004 Collection of Law gives head teachers (or schools) an option of employing teachers without qualification for an inevitable time and amount of lessons taught – as long as it is proven that the position cannot be taken by a fully qualified teacher. In 2019, there were 7% unqualified teachers at lower secondary schools; the range was between 2.5% and 20% in regions (Ministry of education youth and sports, 2019).

Summary

Current problems in the teaching profession are undoubtedly connected with preparation for the job. The absent standards and huge differences in preparation of teachers may have as a consequence a different readiness for teaching. In spite of that, options to lower qualifications demands are still being discussed, and in the political discourse, an alternative joining the profession is getting in the spotlight – life-long education courses. This is a quicker, and cheaper for the country, option of joining the profession. Stakeholders want to hear no arguments claiming that two semesters of a course, which is not even in a day form, cannot substitute a proper study programme. Pedagogical and psychological preparation is pushed to the background, which is at odds with research data (Machingambi et al., 2018; Kan, 2015) showing that full qualification including education in pedagogy and psychology is immensely important for a job of a teacher.

Teacher Self-efficacy

In the TALIS 2018 research, many headteachers mentioned that a lack of unqualified teachers is a complication. In the same research, teacher self-efficacy was also examined. Compared to other European teachers, the Czech ones were significantly below average. One of the lowest results among the countries were in all three areas of examination: motivation and active involving pupils, class management, teaching methods. The biggest gap was in motivation and active involving pupils. This area demands that teachers have certain pedagogical or pedagogical and psychological competencies, which differ in preparations of teachers, and in the case of unqualified teachers, these competencies are absent. It is not known whether unqualified teachers also participated in the 2018 TALIS research, however, due to them being at lower secondary schools, the chance is they were some of the participants. This might have been one of the factors of lower self-efficacy in comparison to participants in other countries.

Naturally, teacher self-efficacy does not reveal real efficiency of teacher, but only how they subjectively perceive their efficiency, meaning their capability to manage individual situations (Gavora et al., 2020; Bandura, 1997; Ninkovic &

Knezevic-Floric, 2018). As a lot of research suggests, teacher self-efficacy is also connected to real efficiency in the teaching profession, quality of teaching, and their pupils' or students' results (Tschannen-Moran et al., 1998). It is this connection between the teacher self-efficacy and their real efficiency that initiates a lot of research in both the Czech Republic and abroad (some of which will be discussed later in this paper). Their results may represent useful outcomes, which can change education of teachers and the profession itself.

However, teacher self-efficacy is not constant. It can develop based on personal experience through practice or changes in educational, cultural, or social context (Smetáčková et al., 2017). Gavora (2008) argues, teacher self-efficacy starts to form already when joining the profession, and over time, it becomes individual and more stable self-efficacy. Since the first practice of Czech (future) teachers is during their studies, it is possible to talk about some development of their own teacher self-efficacy already at that time. These claims are in agreement with the Bandura theory (1997) describing that creating self-efficacy is based on these four sources: experience with fulfilling a task, social modelling, convincing and encouraging by other people, and the ability to regulate signs of stress. Based on data from previous research, these four sources also create teacher self-efficacy (Tschannen-Moran et al., 1998).

Quantitative Research and Research Tools to Measure Teacher Self-efficacy

Interest in examining teacher self-efficacy meant also creating many research tools, which would match, to the greatest possible extent, both the Bandura theory and real teacher's activity. The first tool I must mention is Teacher's efficacy scale – shortened as TES (Gibson & Dembo, 1984), which has been used by many researchers around the world for many years (Deemer & Minke, 2010; Brouwers & Tomic, 2003), and which has also been adapted in the Czech Republic. In the Czech Republic, it was adapted by Greger (2011), in Slovakia by Gavora (2011). The original TES consisted of thirty items and two dimensions – Personal teaching efficacy and General teaching efficacy. The latter one became an object of criticism for its inconsistency in theory (Gavora et al., 2020). There was also a discussion about different results of factor analysis done by authors trying to adapt and use the TES in a different cultural context (Deemer & Minke, 2010; Denzine et al. 2005). Since psychometric characteristics did not reach too high merits either, a shortened 16-item version was created later, and slightly better results were achieved. The 16-item TES was adapted by Gavora (2008) in Slovakia, who, however, also stated that psychometric characteristics were insufficient (34% data explanations and reliability α 0.76 and 0.45).

At the moment, there are two research tools to measure teacher self-efficacy which are worth mentioning, according to Smetáčková et al. (2017). Specifically, The Ohio State Teacher Efficacy Scale – shortened as OSTES (Tschannen-Moran

& Hoy, 2001) and the Norwegian Teacher Self-Efficacy Scale – shortened as NTSES (Skaalvik & Skaalvik, 2007). The OSTES (Tschannen-Moran & Hoy, 2001) created a 24-item scale consisting of three dimensions – Efficacy for student management, Efficacy for instructional strategies, and Efficacy for classroom management. Inconsistency in dimensionality, however, also appeared in this tool. When students of education were added in the sample, factor analysis only revealed one factor which was explored in the version adapted by Gavora as well (2011). While in unidimensional dealing of Tschannen-Moran & Hoy (2001) there was the high – 75% – data variety explained, Gavora (2011) only reached 44.6%. Fluctuating factor scale of the TES and OSTES tools, regularly adapted in more countries, brought questions about validity of the tools. As a result, many researchers decided to create their own scale, which they could tailor to their needs (Gavora & Wiegerová, 2017).

A new tool to measure teacher self-efficacy was also constructed by Skaalvik & Skaalvik (2007), who had the ambition to construct a multidimensional tool, which would fit more a complexity of the teaching profession and at the same time Bandura requirements (Skaalvik & Skaalvik, 2007). Their tool – NTSES – consists of 24 items and six factors. The tool contained the dimensions (factors) as follows: Instruction, Adapt instruction to individual needs, Motivate students, Maintain discipline, Cooperate with colleagues and parents, Cope with change. Factor analyses (exploratory and confirmatory) confirmed good psychometric characters of the scale – for an intended 6-dimensional structure. The scale was firstly verified on a sample of 244 teachers and later on an extended sample of 2249 teachers (Skaalvik & Skaalvik, 2010) and in both research samples, rather high explained variance (60%+) and reliability in all dimensions (0.74–0.91).

A promising constructed validity of this tool lead also to cultural and language adaptations (Avanzi et al., 2013; Khezerlou, 2013; Djigic et al., 2014), which confirmed 6-dimensional structure and good psychometric characters. Good psychometric characters were also confirmed in a Polish research (Baka, 2017), where the suitable solution turned out as 3-dimensional. In the mentioned research though it was only a language adaptation, not a cultural one, as its part would also be a change in the content and deeper discussion with the target group. This may be exactly one of the reasons why the factor structure differed from the above mentioned research. A similar problem was encountered in Sweden, too (Brickman & Olsson, 2021), but the researchers reflect absence of deeper cultural adaptation in the discussion.

Summary of the Introduction

Since the 1990s, the situation in the teaching profession has been discussed in the Czechia. Low interest in the profession, absence of standards, different approaches in preparations of students of education, but also rather a big number

of unqualified teachers at schools – national and foreign research point at these problems. Absent concept and oftentimes also pedagogical preparation of future teachers can relate to low self-efficacy of Czech teachers, which was proven in the TALIS research in 2013 and 2018 (Czech school inspection, 2020).

Also for this reason, it is necessary to examine the teacher self-efficacy deeper and try to reveal areas in which teachers think they are behind, and search for reasons behind it. In our region, teacher self-efficacy has been analysed several times, using even new, own scales, or adapted verified foreign ones. From the foreign ones being presently used, the NSTES tool seems to be suitable since it achieves good psychometric characters even in different cultural backgrounds (Liddy, 2018) and catches quite a wide range of activities of the teaching profession, and is constructed according to the Bandura theory and recommendations. These were my reasons for adaptation and usage of the NTSES, which I describe later in this text.

Methodology

Aims of the Research and Hypotheses

Data presented in this paper represent partial results from an ongoing research with data yet being collected. The aim of this research is to double check the functionality of the NTSES tool in the Czech context and contribute with new empirical data to this still topical discussion in the Czechia – whether pedagogical education and on which level is essential for teachers.

The main research question: How is preparation for the teaching profession mirrored in teacher self-efficacy?

- Hypothesis 1: Experienced teachers have higher self-efficacy than less experienced teachers.
- Hypothesis 2: Teachers with pedagogical education have higher self-efficacy than those without pedagogical education.
- Hypothesis 3: Teachers who graduated at Faculty of Education have higher self-efficacy than those who studied their programmes at a different faculty.

Research Tool – Czech Version of NTSES

I have chosen the NTSES tool for my research (Skaalvik & Skaalvik, 2007), which has been adapted before, or researchers from other countries tried to (Avanzi et al., 2013; Khezerlou, 2013; Djigic et al., 2014; Brickman & Olsson, 2021; Baka, 2017). As for results of its adaptations, I have already written about them in the first part of this paper.

Several independent translators worked on translation of the original NTSES from the English version to Czech, which is according to tradition and recommendations (Orcan, 2018; Gudmundsson, 2009). Four translators with C1 to C2

level English worked on the translation. They were: a psychologist, a teacher, a student of English, and a Ph.D. candidate in educational sciences. The translations were fine-tuned in cooperation with one of the translators and two experts from university. Subsequently, I consulted the items with practicing teachers; we identified problematic questions, which they did not quite understand, and in cooperation with a university expert, those questions were either changed or divided into two so as to be clearer. In case of reverse translation, the translation would not make sense due to the change of formulations of some questions. I do not find absence of reverse translation to be problematic, since several authors warn that reverse translation is insufficient (Epstein et al., 2013; Schendel & Tolmie, 2016; Gudmundsson, 2009) because in the cultural adaptation, it is oftentimes necessary to change the formulation or content (Kara et al., 2006 Delgado-Lobete et al., 2021). What is more, evidence suggest that it is appraisal by experts, which was followed in this case, that is more significant than reverse translation (Epstein et al., 2013).

What followed was verifying individual items and verifying also psychometric characteristics of the tool. Pilot testing was conducted on teachers in the Czech Republic ($n = 260$), with data after cleaning (of those who are students, not yet teaching at schools) being used in this research too ($n = 243$). After collecting pilot data, a Principal component analysis (PCA) was made. The analysis explored six factors corresponding to the previous NTSES. Some duplicate questions were taken out of the tool (those with better characteristics were kept), and then I came to confirmatory factor analysis (CFA). The analysis confirmed exploratory (and expected) structure of the tool and its suitable psychometric characteristics. In the case of an adaptation, using EFA/PCA and CFA is also suitable and common (Orcan, 2018). To verify reliability, McDonald's omega calculations were used, which is a recommended calculation for a multidimensional tool (Dunn et al., 2013). The tool proved to be reliable and valid both constructively and factually, so I could continue using it for collecting data.

The final look of the research tool consists of 27 items divided into six dimensions: instruction, adapt instruction to individual needs, motivate students, maintain discipline, cooperate with colleagues and parents, cope with change. These six dimensions explained 68.2% of variance and reliability of every dimension was $\omega \geq 0.800$ (whole scale $\omega = 0.934$). Results of CFA from pilot testing is presented in Table 4. Respondents marked on a five-point Likert scale how confident they are about their abilities.

Research Sample and Data Collection

There were two rounds of data collection. In the first one, it was primarily to verify the psychometric characteristics of the tool, possible changes, or in case of its insufficient characteristics, change of the tool. The sample consisted

of teachers in the Czech Republic ($n = 243$), who were asked to participate in a Facebook group associating Czech teachers. A condition for filling in the online scale was to be employed as a lower secondary school teacher, or a grammar school teacher teaching respective grades.

After verifying the research tool, I launched collecting research data from attenders of complementary pedagogical education. All faculties offering such education were addressed. One department denied a data collection, one did not open their programme for a lack of frequentists. In the end, data collection was at seven faculties opening qualification courses for teachers. At all departments, data collection was at the beginning of courses. All attenders of these courses were addressed too. Data were collected primarily in person with my being in the lecture. In connection with the COVID-19 pandemics, data were collected online at some universities, though.

Response rate of the questionnaire was between 20–70% at individual faculties, with the total number n = *134. More detailed descriptions of respondents can be found in the following* tables.

As can be seen in the tables above (Table 1, Table 2, Table 3), respondents were a heterogenic group with different education, length of practice, and sex. Interestingly and surprisingly, ratio between men and women copies the real ratio in educational field in the Czech Republic.

Table 1. Educational background

Faculty of Education	Different faculty – teaching programme	Non-teaching programme	Together
160	49	168	377

Table 2. Length of practice

Practice during study	Max. 1 year	1.1–3 years	3.1–5 years	5.1–10 years	10.1 and more years	Together
87	59	59	27	28	117	377

Table 3. Sex

Male	Female	Together
75	302	377

Ethical Aspects

Before the NTSES adaptation, I had contacted Professor Skaalvik via e-mail to enquire whether I would be allowed to try an adaptation in the Czech Republic and whether I could continue using his tool in my research. Professor Skaalvik agreed with both the adaptation and the research usage of the NTSES and granted me a permission via e-mail. All collected data are anonymous, with no identification data. Participants took part voluntarily, with no reward, and with their agreement to use their data for other research and educational purposes. Their agreement was confirmed electronically in the data collection questionnaire. In case of some of them did not confirm their agreement, the questionnaire did not register their answers.

Data Analysis

After some basic adjustment of data I moved to their analysis. Because my sample was tremendously extended and it was data collection after pilot testing, I firstly wanted to verify inner structure of the tool and reliability of measuring again – whether the indexes are consistent. I did the calculations in SPSS and JASP. I firstly did CFA calculations, which were to verify the inner structure of the research tool on a bigger sample ($n = 377$) of teachers in the Czech Republic. Other authors who adapted the tool to measure teacher self-efficacy proceeded in a similar way (Ninkovic & Knezevic-Floric, 2018; Avanzi et al., 2013; Klassen et al., 2009; Dilekli & Tezci, 2020). I entered CFA with a six-dimensional model, which matched the original tool and also results from the pilot testing. There were 27 items in six dimensions with four to six items in each dimension. I was watching important indicators – Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Normed chi-square, Root mean square error of approximation (RMSEA), Standardized root mean square residual (SRMR), factor loadings a p-values and correlations between individual dimensions. After that, I compared that with a unidimensional model and checked Akaike (AIC) and Bayesian (BIC) measured values.

To calculate reliability of the whole scale and also of the individual dimensions, I used McDonald's omega and Cronbach's alfa. It seems to be more suitable to use McDonald's omega for multidimensional tools (Dunn et al., 2013), but I also publish results of Cronbach's alfa, which was used in most teacher self-efficacy research in the past, to be able to adequately compare them with previous studies. Then, I moved to verifying hypotheses using ANOVA calculations and associated post-hoc tests, or eta-squared calculations. I did some calculations using t-tests and then measured the effect size of Pearson's r.

Results

Verification of the NTSES Adapted Tool

CFA confirmed the pilot testing results, when the six-dimensional model seemed to be the most suitable one. In comparison with the unidimensional model, it achieved more than 3000 fewer AIC and BIC points, which suggests this is a more suitable model. Other calculations (presented in Table 4) also prove the suitability of the six-dimensional model. CFI and TLI achieved more than 0.9 value, which is considered a good score (Meschede & Hardy, 2020; Lewis, 2017). RMSEA (0.06) and SRMR (0.05) also achieved acceptable values (Lewis, 2017).

Table 4. Results of CFA

Fit measures	Value	Value (pilot testing)
CFI	**0.917**	0.917
TLI	**0.906**	0.905
RMSEA	**0.06**	‹ 0.05
SRMR	**0.05**	0.057

Factor loadings of two items were narrowly bellow 0.5 (0.471 a 0.485), which should mean consideration whether to keep them (Awang, 2012). However, given their importance and a narrow margin of tolerance, I decided to keep them. Other factor loadings were between 0.53 and 0.95, which are acceptable to good values. These results are significant on p-value (p ≤ 0.001). The ratio of the chi-square statistic to the respective degrees of freedom (normed chi-square) is 2,38, which also means suitable value (Hooper et al., 2008).

Reliability of measurement is proved by McDonald's omega and Cronbach's alfa's results. Instruction (ω = 0.815; α = 0.812), Adapt instruction to individual needs (ω = 0.853; α = 0.851), Motivate students (ω = 0.800; α = 0.794), Maintain discipline (ω = 0.912; α = 0.911), Cooperate with colleagues and parents (ω = 0.821; α = 0.818), Cope with change ω = 0.815; α = 0.814) and the whole tool (ω = 0.934; α = 0.933). Test results of the reliability are comparable with results of the original NTSES and its successfully adapted versions abroad (Skaalvik & Skaalvik, 2007; Avanzi et al., 2013), and even achieve higher values than an adapted version from Serbia (Djigic et al., 2014).

Teacher's Self-efficacy

As can be seen in Table 5, the researched sample of teachers achieved average total teacher self-efficacy 3.69 (on a five-point scale). The strongest confidence in their own abilities was measured in the Instructions dimension,

in which the average self-efficacy was getting close to the maximum. Given the average, standard deviation is not too high, as is also proved by Coefficients of variations.

Table 5. Teachers' self-efficacy results

	N	Min.	Max.	Mean	Std. Deviat.	Coeff. of Variation
Factor 1	377	1	5	4.04	0.63	15.52
Factor 2	377	1	5	3.51	0.71	20.10
Factor 3	377	1.5	5	3.53	0.69	19.60
Factor 4	377	1	5	3.32	0.96	28.86
Factor 5	377	1.25	5	3.89	0.71	21.02
Factor 6	377	1.2	5	3.83	0.69	17.98
Overall SE	377	1.79	5	3.69	0.55	14.96

Hypothesis 1: Experienced teachers have higher self-efficacy than less experienced teachers.

To prove this hypothesis, I divided the sample into two groups: inexperienced with 0–3 years of practice ($n = 205$) and experienced with more than 3 years of practice ($n = 172$). On average, experienced teachers achieved higher total self-efficacy (3.91) compared to inexperienced colleagues (3.50). This difference was rather significant ($p = <0.001$) and with medium applied force ($r = 0.37$). The null hypothesis can be rejected then.

Since collected data offer a deeper analysis and therefore finding out differences among subcategories based on experience, I continued in the analysis. I did the analysis using ANOVA calculations and post-hoc test. Teachers' answers were divided based on their experience (as is in Table 2). The ANOVA results suggest what t-test had revealed before, which is that it is highly unlikely that there would not be significant differences among the groups ($F = 14.522$; $p = <0.001$). Post-hoc test suggests that division into inexperienced (0–3 years of practice) and experienced (more than 3 years of practice) seems to be right. The least experienced teachers have significantly ($p = <0.05$) lower self-efficacy than teachers with more than three years of practice, and teachers with more than ten years of practice have significantly higher self-efficacy than teachers with shorter, maximum equal to three years of practice. Length of practice and amount of experience explain 16.4% variability of the total teacher self-efficacy (Eta-squared).

Hypothesis 2: Teachers with pedagogical education have higher self-efficacy than those without pedagogical education.

To verify this hypothesis, I used Independent Samples T-test calculation, in which I compared resulting self-efficacy of teachers with pedagogical education ($n = 209$) and teachers without pedagogical education ($n = 168$). When it comes to teachers with pedagogical education, I did not distinguish between the faculties they studied. Slightly higher self-efficacy was achieved by teachers with pedagogical education (3.7 compared to 3.67). This result, however, was not significant, hence I cannot reject the null hypothesis; a slight difference discovered in data is a coincidence (Rabušic et al., 2019). Except for one dimension (Instructions), the differences were insignificant even in individual factors of teacher self-efficacy. In the Instructions dimension, teachers with higher pedagogical education achieve higher self-efficacy (4.11 compared to 3.95), and the results are significant with ($p = 0.013$). Pearson's r is low in this case ($r = 0.13$), meaning that the difference and the effect are small (Rabušic et al., 2019).

Based on finding out and level of suspicion that results can be distorted even by an average higher experience of teachers with pedagogical education, I decided to compare these two groups and exclude the more experienced teachers. Criterion for less experienced teachers was set as 0-3 years ($n = 205$). Inexperienced teachers with pedagogical education ($n = 75$) had lower total self-efficacy than inexperienced teachers without pedagogical education ($n = 130$) in values 3.343 and 3.596. The difference among these groups is significant ($p = <0.001$) with small effect size ($r = 0.245$).

Hypothesis 3: Teachers who studied at Faculty of Education have higher self-efficacy than those who studied education at a different faculty.

To verify this hypothesis, I chose Independent sample T-test. Teachers who studied at Faculty of Education ($n = 160$) achieved lower self-efficacy than those who studied an education programme at a different faculty ($n = 49$), values being 3.65 compared to 3.89. This difference is significant ($p = 0.011$) with a small effect size ($r = 0.175$). The null hypothesis is not rejected then. There is, indeed, a difference among the examined groups, however, it is in a relationship contrary to expectations. Higher total self-efficacy but also in individual dimensions is achieved by teachers who studied education at a different faculty than Faculty of Education. Nevertheless, it is important to say that most teachers in this selection who are from different faculties than of education are more experienced, hence the result may be more affected by their experience than the faculty at which they studied. Similarly, to Hypothesis 2, I will take a closer look at this in the next calculation.

Criterion for this calculation was more than ten years of practice in the teaching profession. I compared a group of teachers from faculties of education ($n = 63$)

and teachers from different faculties with education programmes (n = 31). Slightly higher self-efficacy was in this case achieved by teachers from different faculties with education programmes (3.93 compared to 3.99), however, this result turned out to be insignificant (p = 0.514).

Limits of Measurement

Selection of the sample was affected by the pandemics precautions, and also by the fact that these results are only from the pilot testing and partial data from an ongoing research. Individual subcategories of respondents are rather small, therefore some analysis results may be distorted. As a result, one cannot possibly get unequivocal conclusions. These limitations in bigger subcategories already came to light during the data analysis when it was impossible to make several analyses, specifically because of too a small sample (subcategory). For future research, it may be useful to conduct a test-reset analysis, which was absent in this measurement, and which would increase credibility of these measurements.

Discussion

Teacher self-efficacy has been paid attention to by experts world-wide for many years now. There is an interest in this topic even in the Czech Republic, where teacher self-efficacy has become a research topic (Smetáčková et al., 2017; Gavora, 2008) and has been written about and published (Gavora et al., 2020). When doing research, its authors were using their own, newly created research tools or they were trying to adapt some from abroad. When it comes to foreign research tools, in our context there were adapted, e.g. TES (Greger, 2011) and OSTES (Gavora, 2011), with neither of them keeping a consistent inner structure or staying the same, original tool.

When making a decision about what tool to use for our research, an important role was played by the fact that NTSES (Skaalvik and Skaalvik, 2007) had been successfully adapted even behind the borders of its origin (Avanzi et al., 2013; Khezerlou, 2013; Djigic et al., 2014), but also by its being a tool and having the ability to capture teacher self-efficacy quite broadly – in six dimensions. NTSES being an interesting tool for measuring teacher self-efficacy can already be found in publication by Smetáčková et al. (2017); since then, nobody has adapted it nor used it for research. Apart from successful NTSES adaptations abroad, there were even some less successful, which did not confirm the original multidimensional structure (Baka, 2017; Brickman and Olsson, 2021), or the tool was not verified with factor analysis nor reliability test (Liddy, 2018). To adapt this tool successfully, it was vital to approach the whole process rigorously and not to rely only on a good-quality translation, but also changes in individual items or adding new items (Kara et al., 2006; Delgado-Lobete et al., 2021). A part of the

process were discussions with teachers from schools, experts from universities, but also psychometric evaluation of the pilot testing. Absence of discussion with the target group was a discussed possible reason for an unsuccessful attempt at an adaptation in Sweden (Brickman & Olsson, 2021). Psychometric characteristics of the tool turned out to be good, while corresponding the original NTSES (Skaalvik & Skaalvik, 2007), but also its successful adaptations abroad (Avanzi et al., 2013). Multidimensional solutions with six dimensions corresponding the original NTSES with high reliability value worked in the pilot testing and also a followed extension of the sample of other teachers, which was confirmed by CFA, being used in other research as well with this purpose (Denzine et al., 2005; Epstein et al., 2013).

Perceived total teacher self-efficacy in this research corresponds approximately equal to what was measured by colleagues in Norway and Italy. Czech teachers achieved 74% of the maximum, Italian 71%, and Norwegian 69% (comp. Avanzi et al., 2013). Findings that Czech teachers achieve slightly higher self-efficacy compared to Italian and Norwegian ones is surprising, given that in the TALIS research they are among those with the lowest self-efficacy in countries in the research. The absolutely lowest results were achieved by Czech and Norwegian teachers in Maintain discipline subscale (comp. Avanzi et al., 2013), which is also in line with results of the TALIS 2018 research (Czech school inspection, 2020), in which Czech teachers achieved values below average in Classroom management subscale, also asking about maintaining discipline in class. Interestingly, after ranking subscales based on their average value SE in them, Czech and Norwegian results are identical, while Italian results differ except for first two subscales (Instructions, Operations) (comp. Avanzi et al., 2013).

Even though the tool used in TALIS 2018 was different, one can see similar questions in subscales: Instructions – Self-efficacy in instructions; Maintain discipline – Self-efficacy in classroom management; Motivate students – Self-efficacy in students' engagement (comp. Skaalvik and Skaalvik, 2007; TALIS 2018). Comparing results from this research and the TALIS 2018 results, one can notice that low self-efficacy appears repeatedly in subscales focusing on motivating students.

Czech school inspection (2020) emphasised that difference between Czech teachers and EU average is the most obvious (and significant), and low values in this area were achieved also by teachers in this research. On the contrary, results in subscale Instructions, in which the teachers in this research are most confident, do not reach the EU average results, nor the TALIS 2018 research ones (Czech school inspection, 2020). According to Bandura, (in Gavora et al., 2020) self-efficacy is created by experience, among other things. In other words, the more years of practice, the more experience, so the more experienced teachers should recognise their own self-efficacy as higher than less experienced ones. This theory is also confirmed by research in which teachers with more years of practice have

higher self-efficacy (Gavora, 2011). Likewise, in this research, results show that more experienced teachers achieve significantly higher self-efficacy than inexperienced ones.

Even though the difference between sexes in the total self-efficacy was not statistically significant, a big difference even with a statistical difference appeared in the Maintain discipline dimension, in which men are more confident than women. This difference may be caused by the fact that, men tend to seem naturally more authoritarian, so they do not worry about maintaining discipline in class. These findings are in contrast to Gavora (2011) in whose research women achieved higher self-efficacy, and it was with a statistical significance. Such different results may be cause by the research sample, but also by a different research tool finding out different dimensions of teacher self-efficacy.

Teachers with pedagogical education in university education programmes achieved significantly higher total self-efficacy than those without pedagogical education. The result itself is not surprising as many authors (Wiliam, 2018; Kola & Sunday, 2015) write about the importance of pedagogical education in preparation of teachers. Certain unclarity may be caused by the fact that, this difference in this research is not significant, hence we cannot completely ignore the possibility that the difference appeared by chance. A significant differ was confirmed in the Instructions dimension, in which teachers with pedagogical education are more confident. If we have a look at results from another analysis of ours, we will find out that after removing experienced teachers from the sample the difference turned around in favour of teachers without pedagogical education, and rather significantly. This situation could happen primarily because inexperienced teachers, who are working on their pedagogical education, tend to be much older than young teachers, education programmes graduates. Inexperienced teachers had opportunities to have more life experience, therefore be better aware of their self-efficacy.

The differences in this sample came to light even among education programmes graduates. Teachers who studied education at a different faculty than Faculty of Education achieved statistically significantly higher self-efficacy than those who studied at Faculty of Education. I compared these two groups in the subcategory of the most experienced teachers, because I had thought that the results can be distorted by the length of practice. That is because bigger percentage of teachers from other faculties than those of education had more than ten years of practice compared to Faculty of Education graduates. In this sample too, however, higher self-efficacy was achieved by teachers from other faculties. Certainly, differences may be caused by quality of preparation in education programmes, which is proved by Jackson & Miller (2019) research, or, on the other hand, emphasize more on knowledge of their study programme and deemphasize on pedagogical practice itself and knowledge.

Conclusion

The main research question was: How is preparation for the teaching profession mirrored in teacher self-efficacy? An answer to that question could be: Preparation for a job may be connected to teacher self-efficacy. What may be different is pedagogical education compared to non-pedagogical, there are differences even among individual study programmes of education at universities. The results also point out that Czech teachers have the least confidence in motivating students and maintaining discipline, which should be mirrored in preparation of teachers or their other education. Even despite limits, the analysis brought interesting results, which deserve to be verified in another research and on a greater sample of teachers. I believe that the presented results mean a contribution to an ongoing discussion in the education policy in the Czech Republic – or it depends on what education teachers have. The NTSES tool used in this research has repeatedly proved as reliable and valid for research of teacher self-efficacy, hence I recommend this tool to be used even in other research of this focus.

Aknowledgment

REFERENCES

Awang, Z. (2012). *Research Methodology and Data Analysis Second Edition*. UiTM Press.

Avanzi, L., Miglioretti, M., Velasco, V., Balducci, C., Vecchio, L., Fraccaroli, F., & Skaalvik, E. M. (2013). Cross-validation of the Norwegian Teacher's Self-Efficacy Scale (NTSES). *Teaching and Teacher Education*, *31*, 69–78. https://doi.org/10.1016/j.tate.2013.01.002

Baka, Ł. (2017). Norwegian Teacher Self-Efficacy Scale – Psychometric properties of the Polish version of the scale. *Medycyna Pracy*. https://doi.org/10.13075/mp.5893.00569

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control* (1st ed.). Worth Publishers.

Brickman, J., & Olsson, A. (2021). *Self-efficacy and health in Swedish teachers: Validating the Norwegian Teacher Self-Efficacy Scale in a Swedish context*. Örebro University.

Brouwers, A., & Tomic, W. (2003). A Test of the Factorial Validity of the Teacher Efficacy Scale. *Research in Education*, *69*(1), 67–79. https://doi.org/10.7227/rie.69.6

Czech school inspection. (2020). *International research TALIS 2018*. Czech school inspection.

Deemer, S. A., & Minke, K. M. (2010). An Investigation of the Factor Structure of the Teacher Efficacy Scale. *The Journal of Educational Research*, *93*(1), 3–10. https://doi.org/10.1080/00220679909597624

Delgado-Lobete, L., Montes-Montes, R., Méndez-Alonso, D., & Prieto-Saborit, J. A. (2021). Cross-Cultural Adaptation and Preliminary Reliability of the Adolescents and Adults Coordination Questionnaire into European Spanish. *International Journal of Environmental Research and Public Health*, *18*(12), 6405. https://doi.org/10.3390/ijerph18126405

Denzine, G. M., Cooney, J. B., & McKenzie, R. (2005). Confirmatory factor analysis of the Teacher Efficacy Scale for prospective teachers. *British Journal of Educational Psychology*, *75*(4), 689–708. https://doi.org/10.1348/000709905x37253

Dilekli, Y., & Tezci, E. (2020). A cross-cultural study: Teachers' self-efficacy beliefs for teaching thinking skills. *Thinking Skills and Creativity*, *35*, 100624. https://doi.org/10.1016/j.tsc.2019.100624

Djigic, G., Stojiljkovic, S., & Doskovic, M. (2014). *Basic Personality Dimensions and Teachers' Self-efficacy* (Vol. 112). Elsevier BV. https://doi.org/10.1016/j.sbspro.2014.01.1206

Dunn, T. J., Baguley, T., & Brunsden, V. (2013). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, *105*(3), 399–412. https://doi.org/10.1111/bjop.12046

Epstein, J., Osborne, R. H., Elsworth, G. R., Beaton, D. E., & Guillemin, F. (2013). Cross-cultural adaptation of the Health Education Impact Questionnaire: experimental study showed expert committee, not back-translation, added value. *Journal of Clinical Epidemiology*, *68*(4), 360–369. https://doi.org/10.1016/j.jclinepi.2013.07.013

Gavora, P. (2008). Profesijná zdatnosť vnímaná učiteľom. Adaptácia výskumného nástroja [Teachers self-efficacy. Adaptation of the research tool]. *Pedagogická Revue*, *50*(3–4).

Gavora, P. (2011). Zisťovanie profesijnej zdatnosti učiteľa pomocou dotazníka OSTES [Teachers Self-efficacy measured by OSTES]. *Pedagogika.Sk*, *2*(2).

Gavora, P., Mareš, J., Svatoš, T., & Wiegerová, A. (2020). *Self efficacy v edukačních souvislostech II [Self-efficacy in educational context II]*. Univerzita Tomáše Bati. Zlín.

Gavora, P., & Wiegerová, A. (2017). Self-efficacy of Students in a Preschool Education Programme: The Construction of a Research Instrument. *The New Educational Review*, *47*(1), 125–138. https://doi.org/10.15804/tner.2017.47.1.10

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, *76*(4), 569–582. https://doi.org/10.1037/0022-0663.76.4.569

Greger, D. (2011). Jak čeští učitelé hodnotí vlastní efektivitu? Adaptace zahraničního dotazníku [Self-efficacy of Czech teachers? Adaptation of the research tool]. *Presentation in conference ČAPV, Brno*.

Gudmundsson, E. (2009). Guidelines for translating and adapting psychological instruments. *Nordic Psychology*, *61*(2), 29–45. https://doi.org/10.1027/1901-2276.61.2.29

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *The Electronic Journal of Business Research Methods*, *6*(1), 53–60.

Jackson, N., & Miller, R. (2019). Teacher Candidates' Sense of Self-Efficacy Toward Classroom Management. *Journal of Education*, *200*(3), 153–163. https://doi.org/10.1177/0022057419881169

Kan, A. U. (2015). Prospective teachers' perceptions of teaching profession. *Contemporary Educational. Researches Journal, 5*(1), 12–16.

Kara, M., van der Bijl, J. J., Shortridge-Baggett, L. M., Astı, T., & Erguney, S. (2006). Cross-cultural adaptation of the diabetes management self-efficacy scale for patients with type 2 diabetes mellitus: Scale development. *International Journal of Nursing Studies*, *43*(5), 611–621. https://doi.org/10.1016/j.ijnurstu.2005.07.008

Khezerlou, E. (2013). Teacher Self-efficacy as a Predictor of Job Burnout Among Iranian and Turkish EFL Teachers. *Procedia – Social and Behavioral Sciences*, *70*, 1186–1194. https://doi.org/10.1016/j.sbspro.2013.01.175

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y., & Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology, 34*(1), 67–76. https://doi.org/10.1016/j.cedpsych.2008.08.001

Kola, A. J., & Sunday, O. S. (2015). A Review of Teachers' Qualifications and Its Implication on Students' Academic Achievement in Nigerian Schools. *International Journal of Educational Research and Information Science, 2*(2).

Korbel, V., & Prokop, D. (n.d.). *Proč se lidé nehlásí ke studiu učitelství a jak to změnit? [Whz is not interest for teaching education and how to change that?].* https://www.ucitelnazivo.cz/files/1875-proc-se-lide-nehlasi-ke-studiu-ucitelstvi-a-jak-to-zmenit.pdf (Retrieved August 8, 2022)

Law about pedagogical workers, Act No. 530 C.O.L. (2004). https://www.msmt.cz/dokumenty-3/zakon-o-pedagogickych-pracovnicich-1

Lewis, T. (2017). Evidence Regarding the Internal Structure: Confirmatory Factor Analysis. *Measurement and Evaluation in Counseling and Development, 50*(4), 239–247. https://doi.org/10.1080/07481756.2017.1336929

Liddy, E. (2018). The impact of an accelerated teacher training programme based on a pedagogy of enactment on trainees' self-efficacy. *Research in Action.*

Machingambi, B., Oyedele, V., Chikwature, W., & Oyedele, O. (2018). Influence of teachers' qualification on students' performance in 'a'-level sciences at selected secondary schools in mutare district, manicaland province in zimbabwe. *International Journal of Academic Research and Reflection, 6*(06).

Meschede, N., & Hardy, I. (2020). Selbstwirksamkeitserwartungen von Lehramtsstudierenden zum adaptiven Unterrichten in heterogenen Lerngruppen. *Zeitschrift Für Erziehungswissenschaft, 23*(3), 565–589. https://doi.org/10.1007/s11618-020-00949-7

Ministry of Education Youth and Sports. (2019). *Hlavní výstupy z Mimořádného šetření ke stavu zajištění výuky učiteli v MŠ, ZŠ, SŠ a VOŠ [The main results from the research of teaching and teachers in schools].* Prague.

Ninkovic, S., & Knezevic-Floric, O. (2018). *Validation of the Serbian version of the teachers' sense of efficacy scale (TSES), 50*(1). National Library of Serbia. https://doi.org/10.2298/zipi1801072n

Orcan, F. (2018). Exploratory and Confirmatory Factor Analysis: Which One to Use First? *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi,* 414–421. https://doi.org/10.21031/epod.394323

Rabušic, L., Soukup, P., & Mareš, P. (2019). *Statistická analýza sociálněvědních dat (prostřednictvím SPSS) [Statistical analysis in social sciences].* Masarykova univerzita.

Salman, M. F., & Adeniyi, C. O. (2012). Influence of teachers' qualification and experience on secondary school students' academic performance in mathematics. *Abacus, the Journal of Mathematical Association of Nigeria, 37*(1), 134–141.

Schendel, R., & Tolmie, A. (2016). Beyond translation: adapting a performance-task-based assessment of critical thinking ability for use in Rwanda. *Assessment & Evaluation in Higher Education, 42*(5), 673–689. https://doi.org/10.1080/02602938.2016.1177484

Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology, 99*(3), 611–625. https://doi.org/10.1037/0022-0663.99.3.611

Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education, 26*(4), 1059–1069. https://doi.org/10.1016/j.tate.2009.11.001

Smak, M., & Walczak, D. (2017). The prestige of the teaching profession in the perception of teachers and former teachers. *Edukacja.* https://doi.org/10.24131/3724.170502

Smetáčková, I., Topková, P., & Vozková, A. (2017). Development And Piloting Of Teacher Self-Efficacy Scale. *Lifelong Learning, 7*(2), 26–46. https://doi.org/10.11118/lifele2017070226

Spilková, V., & Dvořáková, H. (2004). *Současné proměny vzdělávání učitelů [Actual changes in teachers education]*. Paido.

Spilková, V., & Wildová, R. (2014). Potřebujeme kvalitní nebo kvalifikované učitele [Do we need teachers with high qualified or high quality]? *Pedagogická Orientace, 24*(3), 423–432. https://doi.org/10.5817/pedor2014-3-423

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher Efficacy: Its Meaning and Measure. *Review of Educational Research, 68*(2), 202–248. https://doi.org/10.3102/00346543068002202

Tschannen-Moran, M., & Hoy, A. W. (2001). Ohio State Teacher Efficacy Scale. *PsycTESTS Dataset.* https://doi.org/10.1037/t11400-000

Wiliam, D. (2018). *Creating the Schools Our Children Need.* Learning Sciences International.