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INSTRUCTIONS FOR AUTHORS

The Journal on Efficiency and Responsibility in Education and Science publishes papers of the following categories: full research papers, short communications, review studies and book reviews (on invitation only).

- FULL RESEARCH PAPERS
- SHORT COMMUNICATION
- REVIEW STUDY

Papers are published in English. A paper may comprise an empirical study using an acceptable research strategy, such as survey, case study, experiment, archival analysis, etc. It may contain a theoretical study aimed at advancing current theory or adapting theory to local conditions or it may arise from theoretical studies aimed at reviewing and/or synthesizing existing theory. Concepts and underlying principles should be emphasized, with enough background information to orient any reader who is not a specialist in the particular subject area.

Submission checklist

The paper. The paper is carefully formatted according to the template of the journal (see bellow). Special attention is paid to the exact application of the Harvard referencing convention to both continuous citations and list of references. If an electronic source has the DOI number assigned, also it will be provided in the list of references. Manuscripts are submitted via the editorial system in the DOC.

Research highlights. The core results, findings or conclusions of the paper are emphasized in 2-4 bullet points (max. 150 characters per bullet point including spaces). The highlights are submitted as a text into the submission form in the editorial system.

Copyright form. The submission of a paper will imply that, if accepted for publication, it will not be published elsewhere in the same form, in any language, without the consent of the Publisher. The manuscript submitted is accompanied by the copyright form signed by the corresponding author who declares the agreement of all authors with the conditions in the Form. The Form is submitted into the editorial system in the PDF format.

Suggested reviewers. It is required to suggest two experts appropriate to evaluation of the paper. The experts should be out of the affiliation of the author(s), Czech University of Life Sciences Prague, and also both experts should be from different affiliations. The reviewers are submitted into the text fields in the submission form of the editorial system.

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Papers must be closely scrutinized for typographical and grammatical errors. If English is not author's first language then the paper should be proof-read by a native English-speaking person, preferably one with experience of writing for academic use. Spelling should follow the Oxford English Dictionary.
Tables, graphs and illustrations should be drawn using a suitable drawing package. Colour may be used. Place all diagrams and tables where you wish them to appear in the paper. Ensure your diagrams fit within the margins and are resizable without distortion.

Review procedure

Following Editorial recommendation, papers are submitted to a double-blind peer review process before publication. Commentary by reviewers will be summarized and sent by email to authors, who can choose to revise their papers in line with these remarks. Re-submitted papers should be accompanied by the description of the changes and other responses to reviewers' comments (see above), so that the desk-editor can easily see where changes have been made.

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Authors are fully responsible for the paper's originality and for correctness of its subject-matter, language and formal attributes. Author's statement should be enclosed declaring that the paper has not been published anywhere else.

The submission of a paper will imply that, if accepted for publication, it will not be published elsewhere in the same form, in any language, without the consent of the Publisher. Before publication, authors will be asked to complete a copyright release, giving the publisher permission to publish the paper in a specific issue of this Journal. Overall copyright ownership of the paper, however, remains with the author/s. It is the authors' responsibility to obtain written permission to quote material that has appeared in another publication.

We would like to cordially invite you to participate in the 19th International Conference on Efficiency and Responsibility in Education (ERIE 2022) that will take place at the Faculty of Economics and Management, Czech University of Life Sciences Prague on June 2-3, 2022. The conference topics are Theory and Methodology of Pedagogy and Education; Information and Knowledge in Lifelong Education and Training; ICT in Education; Applications, Practice and Experience; and Responsibility in Education, Ethical Issues. This year, the main topic of the conference is Sustainable teacher education through practitioner inquiry. For more details, please visit the conference website erie.pef.czu.cz.

In the first issue of the year 2022 (Vol. 15, No. 1) that you hold in your hands, we are pleased to present six articles from authors from the Czech Republic, Hungary, Slovakia, Turkey, and the United States. The common topics of the issue are related to distance learning, new methodologies in education and ethics in education.

The first article entitled "The Relationship Between Secondary School Teachers and Students' Readiness of Using Flipped Classroom" written by İbrahim Yaşar Kazu and Cemre Kurtoğlu Yalçin from Firat University and Ministry of Education in Turkey, investigates the relationship between secondary school teachers' and their students' flipped classroom readiness. For this purpose, data were collected through a scale for flipped classroom readiness of teachers and their students with 745 participants randomly selected from 5th and 8th grade students and 233 teachers from five different secondary schools in Elazig, Turkey. The authors observed that teachers and students are generally ready to apply flipped classroom model, as well as there is a positive relationship between teachers and their students' technology self-efficacy. In addition, the students whose teachers are open-minded have more positive opinions on the flipped classroom.

The second article "Cutting the vicious circle: Addressing the inconsistency in teachers' approaches to academic integrity breaches" by Jana Dannhoferová, Tomáš Foltýnek, Dita Dlabolová and Teddi Fishman from Mendel University in Brno and American Public University in the United States, describes a case study about the academic dishonesty based on data collected at one Czech university. The case study combines quantitative self-reported data and qualitative data from students and teachers with hard data from the disciplinary committee. The authors analyse cases and types of breaches, identify characteristics of students that incline toward cheating and, also, investigate some of the reasons leading to these actions. The research confirms that the inconsistent approach of teachers is a contributing factor to students' propensity to violate academic integrity rules. In this case, the teachers play a key role in the prevention as it is their duty to report cases of suspected misconduct, but they need tools to improve the culture of academic integrity.

The third article "Exploring the Teachers' Perception towards Educational Inclusion: A Study of Teachers' in Pune, India" from Ambuj Sharma, Reena Malik and Henrietta Nagy at Govind Ballabh Pant Social Science Institute, Chitkara Universit in India and Kodolanyi Janos University in Hungary, analyses university teachers' perceptions towards the inclusion of students with disability public and private universities in India. The study examined how age, gender, educational levels, years of teaching experience, and frequency of interaction with a person with a disability influence instructors' views about people with disabilities and their inclusion at public and private academic institutions. The analysis includes 309 university full-time teachers from private and public universities in Pune, India. The study revealed no statistically significant relationships between teachers' perceptions of inclusion considering degree level, gender and years of experience. The study did, however, discover a statistically significant relationship between teachers' perceptions of inclusion and their interaction with students with disabilities.

The fourth article "Efficiency of Public and Private Service Delivery: The Case of Secondary Education" written by Renata Halásková, Beáta Mikušová Meričková and Martina Halásková from University of Ostrava in the Czech Republic and Matej Bel University in Slovakia, aims to evaluate the services efficiency of 26 grammar schools in the Prešov region in Slovakia. For this purpose, the authors used Data Envelopment Analysis and data for the period 2012-2013 to 2016-2017. The evaluation based on the average efficiency score showed that, from the viewpoint of the types of providers, public grammar schools reached higher efficiency scores, in comparison with church and private grammar schools. These findings expand on the theory of public goods with respect to their production and render valuable information for not only education providers, but also the creators of the regional strategic plans in the education policies.

The fifth article "Evaluation of final examination performance at Czech University of Life Sciences during the COVID-19 outbreak" from Lukáš Moravec, Jakub Ječmínek and Gabriela Kukalová from the Czech University of Life Sciences Prague, evaluates the impact of distance education on examination results of tax related subjects collected during the period from 2014 to 2020. The sample consists of examination results of 120 different classes within 6 years with a total amount of 7,268 observations. The results suggest that the odds

that a student successfully passes the exam increases if a student was examined online compared to in-person. Additionally, it is expected that on average 82 students out of 100 will successfully pass the exam.

The last article "Attitudes of Employers and University Students to the Requirements for Accountants in the Czech Republic" by Kateřina Berková and Lenka Holečková from Prague University of Economics and Business in the Czech Republic, verifies employers' and university students' perception of the importance of professional and soft competencies for the financial accountant in the Czech Republic. The perception of employers is not in accordance with the importance of competencies perceived by the students who would like to work in the accounting profession. Responsibility, reliability, accuracy, and independence are important for students, whereas employers focus more on the competencies linked to information literacy and skills regarding the English language in accounting.

We would like to thank all authors who have submitted their manuscripts to ERIES Journal and special thanks to all reviewers for their effort in revising the manuscripts. We hope that all our readers will find this first issue of the year 2022 appealing, creating opportunities for future research. We also hope that the published articles will positively contribute to the field of efficiency and responsibility in education as it has been during recent years.

Sincerely

Martin Flégl
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CONTENT

Full research paper

THE RELATIONSHIP BETWEEN SECONDARY SCHOOL TEACHERS AND STUDENTS' READINESS OF USING FLIPPED CLASSROOM

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ABSTRACT

The emergence of instructional technologies has made inevitable changes in educational settings. The flipped classroom that integrates education with technology has grown in popularity in recent years. This study intends to investigate the relationship between secondary school teachers' and their students' flipped classroom readiness. Data were collected through a scale for flipped classroom readiness of teachers and their students. There were 745 participants randomly selected from 5th and 8th grade students and 233 teachers from five different secondary schools in Elazig, Turkey. It is concluded that teachers and students are generally ready to apply this model. Additionally, there is a positive relationship between teachers and their students' technology self-efficacy. Also, the students whose teachers are open-minded have more positive opinions on the flipped classroom. The study hopes to contribute to the increase in the usage of the flipped classroom in educational settings regarding both teachers' and their students' readiness. It has pedagogical implications for teachers to be trained and given more knowledge about the model so that the more the teacher is informed with the flipped classroom the more students can benefit.

KEYWORDS

Flipped classroom readiness, flipped learning, planning classroom time, teaching and learning, technology-based learning

HOW TO CITE

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Highlights

- *Teachers' and their students' flipped classroom readiness affect each other positively.*
- *There is a positive relationship between teachers and their students' technology self-efficacy.*
- *The students whose teachers are open-minded have more positive opinions on the flipped classroom.*
- *Secondary school teachers have high readiness for the flipped classroom rather than their students.*

INTRODUCTION

Consistent change and development of technology causes some alteration in the teaching and learning process. Especially nowadays, our world is under the influence of an epidemic, Covid-19. Because of this illness, face to face education has been interrupted and distance learning through computers and internet has become popular. That's why benefiting from information and communication technologies in education has become inevitable (Dikmen and Tuncer, 2018). Bernacki, Greene and Crompton (2020) claim that integrating technology with the teaching and learning process can become more efficient so that qualified individuals may be raised in this way. Hereby, it makes using new learning approaches the current issue. In this regard, flipped classroom, based on the inverting of the traditional classroom model by introducing course subjects before class, allowing teachers to use class time to guide each student through active, practical, innovative applications of the course (Strelan, Osborn and Palmer, 2020), has become popular recently as one of the newest learning approaches. The flipped classroom is a current teaching and learning model that gives a chance for online education. Brooks (2014) defined the flipped classroom that has become popular in recent years as a combination of instructional technologies and active learning strategies. Research that was carried out confirmed

that students' attention decreases after the 10 minutes of class, although returning their attention to the class can be managed, they can remember only 20% of items that presented during the class (Mohanty and Parida, 2016). Traditional education gives students the opportunity to read the coursebook, listen to the lecture in class time and work on problem sets out of class time. On the contrary, the flipped classroom is centred on the idea that to attain success in education by providing online video lectures to learners before class time and expecting them to work and understand the subject prior to coming to class, thus enabling the teacher to reinforce the subject with metacognitive activities (Akçayır and Akçayır, 2018).

Technology integrated with the teaching and learning process increases the quality of education and changes the ways teachers teach and learners learn (Wells, de Lange, and Fieger, 2008). The education system has begun to emphasize learner-centred learning environment rather than teacher-centred instruction (Hwang, Lai and Wang, 2015). As it is known, traditional educational settings can't support students' higher-order skills adequately (Bergman and Sams, 2013). With the development of science and technology, it has been agreed that teacher-centred education system should be abandoned. In order to comply with the age's needs, student-centred education system should be adopted. This alteration causes changes in the understanding of the teacher. The understanding of the traditional teacher who is a strict knowledge provider has been replaced with the concept of a teacher who guides students to learn learning on their own. It is known that teachers play an essential role in students' education life. Teachers are the critical point that makes children ready for the age of technology. According to Prensky (2001), children of our age are digital natives. They were born in technology and are used to solving almost all of their problems with technology. In this case, we can't expect them to learn the lectures, do homework, read the textbooks like the previous generation. Based on Prensky's (2001) definition for digital natives, teachers have to alter the learning environments by abandoning the traditional instructional approach. In such a renovated century, learning environments are expected to be equipped with technology at the highest order (Bolat, 2016). It is approved that there is a strong association between the approach that teachers' adopt and learners' learning (Prosser and Trigwell, 1999). The learning environment that teachers provide is a place where they implement their perceptions of teaching and learning. That's why, if teachers equipped their classroom and teaching with technology, it could be inevitable that students become integrated with technology. On the other hand, teachers should be open-minded to change their teaching habits in learning context and be open to apply new teaching and learning methods in educational settings. They should follow new developments in education and be eager to apply the ones that are suitable for them and their students in their learning environment. The flipped classroom is a recent approach that integrates technology into education (Şahin, Ökmen and Kılıç, 2020). This model aims to answer the needs of digital natives who could have video calls and send text messages, which could happen in minutes via technology (Asogwa, 2020). Yough et al. (2017) confirm that the flipped classroom eliminates the limitations of traditional instruction by motivating teachers and learners. With the help of this student-centred method, students can find the opportunity to learn the subject by watching recorded videos at their own pace independently of time and place outside the classroom (Asef-Vaziri, 2015; Moos and Bonde, 2016; Sun, Xie and Anderman, 2018). While students are expected to take their own learning responsibility (Davies, Dean and Ball, 2013; Kong, 2014), teachers are supposed to plan metacognitive activities such as problem-solving, debates, group activities, etc. to reinforce students' learning in the classroom (Asef-Vaziri, 2015; Filiz and Kurt, 2015; O'Flaherty and Phillips, 2015; La-Marca and Longo, 2017). While Shih and Tsai (2017) approve that flipped classroom allows more active learning strategies in classroom, Blau and Shamir-Inbal (2017) express the advantage of this model as taking care of students individually. On the other hand, implementation of this model lays a burden on teachers and students. Both of them are required to be eager to do previews, although it has been considered to reduce teachers' duties and classroom preparation (Filiz and Kurt, 2015).

LITERATURE REVIEW

For the first time, flipped classroom system has begun to be used by the professors of economy at Miami University in the field of business, law, sociology, psychology and philosophy because of the extra reading tasks (Lage, Platt, and Treglia, 2000). Flipped classroom proposed by Bergmann and Sams (2007), who are working as teachers at Woodland High School, was developed for students who could not attend regular classes. Thus, this model has become popular in the field of education and attracts almost all of the instructors' interest. Furthermore, the instructors from Northern Colorada University began to spend their class time for activities and group work, and to apply online or downloadable lecture videos to teach the content (Bergmann and Sams, 2012). In this way, it has become widespread with more than thousands of users (Talbert, 2012).

The flipped classroom, also known as inverting the classroom, is a process that reverses the traditional instruction model. Teachers are the providers of knowledge, and students are given the task of solving the problem at home in the traditional classroom model. The flipped classroom, presented as an alternative to the traditional learning approach (Şen and Hava, 2020), is based on learning the lecture by students on their own via online or recorded video lessons by using the internet and technology and reinforcing the subjects in class at the guidance of the teacher with metacognitive activities. Inverting the classroom; taking the information out of class time by reading or listening to the videos, in class time, practising the lecture with the help of challenging and metacognitive activities such as debate, problem-solving, group activities, is considered as a way of success (Seaman and Gaines, 2013).

The implementation of the flipped classroom in learning environments increase students' motivation for learning (Gannod, Burge and Helmick, 2008; Davies, Dean, and Ball, 2013), academic performance (Tune, Sturek and Basile, 2013; Yestrebsky, 2014; Kong, 2014; Bösner, Pickert and Stibane, 2015), collaboration competence (Strayer, 2012), positive attitude towards the lecture (Touchton, 2015; McLaughlin et al.,

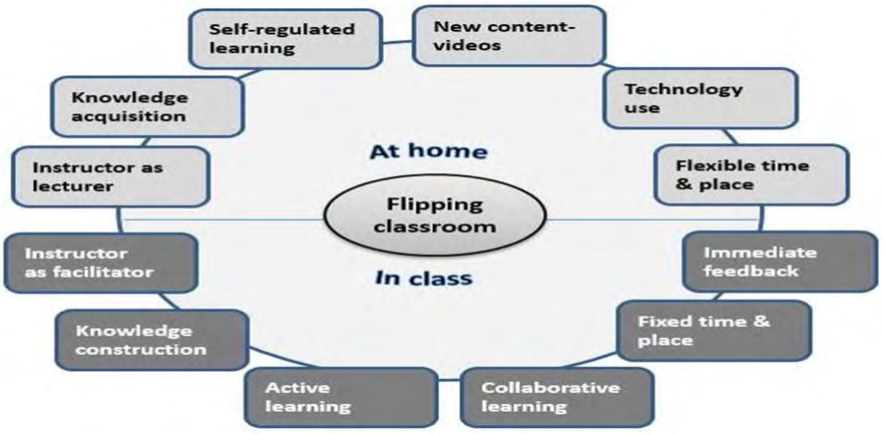

Figure 1: The components of flipped classroom model (source: Blau and Shamir-Inbal, 2017: 75)

2014; Johnston, 2017) also reduce their anxiety level (Marlowe, 2012). For instance, the study results conducted by Wiginton (2013) showed that implementation of the flipped classroom has a *positive* effect on students' mathematics success. Cummins-Sebree and White (2014) found that the students who prepared for the class before were more active during the class time than the others. Kong (2014) confirmed that flipped classroom had positive effects on learners' reflective thinking skills and information literacy. Touchton (2015) concluded that flipped classroom was found more *enjoyable* than the traditional approach and supported learning. Yestrebsky (2015) carried out an experimental study to investigate the effects of the flipped classroom on students' success. The study confirmed that the students who learned chemistry via the implementation of the flipped classroom became more *successful*. Bhagat, Chang and Chang (2016) carried out an experimental study and reached *similar* results. While Moos and Bonde (2016) found that watching recorded videos at their own pace increased learners' motivation, similar results were achieved by Hung (2017). Almost all of the studies carried out in this field claimed that this model *develops* students' academic performance as well as their critical thinking, teamwork, self-assessment competencies.

Although many studies were carried out to investigate the effects of the flipped classroom on learners' success and motivation, no study which investigates the effects of teachers' readiness for this model on students' readiness has been carried out so far. This study is significant because it presents the findings related to the relationship between the flipped classroom readiness of teachers and their students. It aims to investigate in which perspectives teachers' readiness effect their students' flipped classroom readiness. In the light of the main goal, the paper addressed the following hypothesis.

- *The beliefs of teachers' and their students' will be positive about their flipped classroom readiness.*
- *No significant difference will exist in the students' flipped classroom readiness with the teachers'.*
- *There will be a positive relationship between teachers' and their students' flipped classroom readiness.*

MATERIALS AND METHODS

Research Model

This study investigates the relationship between flipped classroom readiness of secondary school students and their teachers. As it presents existing circumstances, a descriptive survey model is used to describe a previous or ongoing circumstance.

Participants

A total of 745 students and 233 teachers from five different secondary schools in Elazig were enrolled in the study conducted in the 2018–2019 academic year. 383 5th graders and 362 8th graders, totally 745 students, and 233 teachers were recruited by simple random sampling in five schools. All participation in the study was on a voluntary basis.

Accordingly, 53.2% of the participants are female and 46.8% are male. According to *the school variable*, 20.5% of the students are from Mustafa Kemal, 18.4% from Şehit Önder Pınar, 25.1% from Cumhuriyet, 23.0% from Bahçelievler and 13.0% from Avukat İbrahim Gök Secondary School. According to the demographic information of teachers, 65.2% of the participants are female and 34.8% are male. When *the gender variable* is considered, it can be stated that the number of female teachers is higher than male teachers. According to *the school variable*, 28.5% of the teachers are from Mustafa Kemal, 21.0% from Şehit Önder Pınar, 26.2% from Cumhuriyet, 17.2% from Bahçelievler and 9.8% from Avukat İbrahim Gök Secondary School. In addition, 16.7% of them are between 22 and 29 years old, 31.3% of them are 30–37 years old, 32.6% of them are 38–45 years old, and 19.4% of them are 46 and more. It can be said that the majority of participants are between 30–37 and 38–45. The majority of participants are Turkish, Maths, Science and English teachers respectively. Finally, 16.7% of teachers have 1–5 years professional seniority, 21.5% have 6–10 years, 18.4% have 11–15 years, 18.9% have 16–20 years and the rest have 20 years and more.

Students		Frequency	Percentage	Teachers		Frequency	Percentage
Do you have a computer?	Yes	423	56.8	Do you have a computer?	Yes	222	95.3
	No	322	43.2		No	11	4.7
Do you have an Internet access?	Yes	478	64.2	Do you have an Internet access?	Yes	213	91.4
	No	267	35.8		No	20	8.6
How do you perceive yourself to use the technological devices?	Enough	387	51.9	How do you perceive yourself to use the technological devices?	Enough	102	43.8
	Middle	291	39.1		Middle	114	48.9
	Insufficient	67	9.0		Insufficient	17	7.3
How often do you use the Internet in a day?	Less than 1 hour	356	47.8	What kind of technological equipment are there in your school?	Smart board	184	79.0
	1-3 hours	297	39.9		Internet	125	53.6
	4-6 hours	55	7.3	Do you use the technology actively in your classroom?	Yes	157	67.4
	More than 6 hours	37	5.0		No	76	32.6
Why do you use the Internet most?	Social media	186	24.9				
	Entertainment	216	28.9				
	Study	343	46.2				
	Total	**745**	**100.0**		**Total**	**233**	**100.0**

Table 1: Information about students' and teachers' technology usage, (source: own calculation)

As shown in Table 1, 423 of the participants have access to a computer, and 478 have internet access. In addition, 51.9% perceive themselves as having enough expertise to use technological devices, 39.1% express themselves as middle, while 9.0% express having insufficient expertise. 47.8% of them use the internet less than one hour, 39.9% of them 1–3 hours, 7.3% of them 4–6 hours, and 5.0% of them more than 6 hours in a day. 24.9% of the participants use the internet *mostly* for social media, 28.9% for entertainment (playing games, listening to music, etc.), and 46.2% for studying. As seen in the table, 222 of the participant teachers have a computer and 213 of them have *internet access.* In the light of this data, it can be said that most of the participant teachers have *computer and internet access.* 43.8% perceive themselves as being enough to use technological devices, 48.9% express themselves as middle, while 7.3% express as insufficient. Accordingly, there is a smart board at 184 of participant teachers' school, while 125 teachers have internet access in their classrooms. Moreover, 157 participant teachers express that they *use* the technology actively in their classrooms.

Data Collection Tools

Two different scales were used for data collection. A Scale for Flipped Classroom Readiness of Secondary School Students' developed by Hao (2016) and adapted to Turkish by Durak (2017) was used for collecting data from students. 'A Scale for Flipped Classroom Readiness of Secondary School Teachers' was adapted by the researcher from the scale for students.

The students' scale consists of a total of 26 items and 5 sub-dimensions, namely *self-directed learning, technology self-efficacy, in-class communication self-efficacy, motivation for learning* and *doing preview.* The scale is a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). Reliability analysis has been performed and a Cronbach's Alpha score of 0.864 was obtained. Cronbach's Alpha Scores for the sub-dimensions are 0.942, 0.956, 0.897, 0.820, 0.705 respectively. A Scale for Flipped Classroom Readiness of Secondary School Teachers consists of 36 items and 5 sub-dimensions, namely students' *control self-efficacy, technology self-efficacy, self-efficacy for planning classroom time, readiness for preparatory work* and *being open-minded*. The scale is a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). Reliability analysis has been performed and a Cronbach's Alpha of 0.883 was obtained. The analysis has shown that Cronbach's Alpha Score of the sub-dimensions are 0.799, 0.931, 0.853, 0.910, 0.922 respectively.

Data Analysis

Data were analyzed using SPSS Version 22.0. In order to analyze demographic data, descriptive statistical methods such as percentage, mean and standard deviation were used. Moreover, to evaluate the data according to the variables, *Shapiro Wilk* test and *Kolmogrov Smirnov* were performed and homogeneity of variances was tested. The one-sample *t*-test to determine whether an unknown population mean is different from a specific value was administered, an independent sample *t*-test for comparing the mean scores of the participants was chosen and to determine the relationship between students' and teachers' scores correlation analysis was used.

RESULTS

Findings are given as to whether the scores of the students and teachers that took part in the sample group correlated significantly. The findings obtained by research are presented in the tables.

The results of the implemented analysis confirm that students and teachers 'strongly agree' with having the qualities flipped classroom requires (*Students' Mean* = 3.86) and (*Teachers' Mean* = 3.94). In the light of the data, it can be said both of them were highly skilled in five-sub-dimensions. As shown in Table 2, students 'strongly agree' with having self-directed learning skill (*Mean* = 3.83), technology self-efficacy (*Mean* = 3.61), in-class communication self-efficacy (*Mean* = 4.00), motivation for learning (*Mean* = 4.04), doing previews (*Mean* = 3.86).

Student (*N*=745)				Teacher (*N*=233)			
	M	*Sd*	*p*		*M*	*Sd*	*p*
Self-directed learning	3.83	.61366	.050	Providing students' control self-efficacy	3.92	.54487	.045
Technology self-efficacy	3.61	.77348	.032	Technology self-efficacy	4.13	.81386	.024
In-class communication self-efficacy	4.00	.92367	.048	Self-efficacy for planning classroom time	4.24	.63712	< .001
Doing previews	3.86	.95866	.036	Readiness for preparatory work	3.43	.78868	.035
Motivation for learning	4.04	.87489	< .001	Being open-minded	4.00	.75245	.018
Flipped Classroom	3.86	.60237	< .001	Flipped Classroom	3.94	.59720	< .001

Table 2: Teachers' and students' beliefs about their flipped classroom readiness, (source: own calculation)

On the other hand, teachers 'strongly agree' with being able to provide students' control self-efficacy (*Mean* = 3.92), technology self-efficacy (*Mean* = 4.13), self-efficacy for planning classroom time (*Mean* = 4.24), readiness for preparatory work (*Mean* = 3.43), being open-minded (*Mean* = 4.00). The standard value is 3.00 in this study. Accordingly, the flipped classroom readiness of secondary school students and teachers is *positive* in general ($t = 8.756$, $p < .001$; $t = 13.354$, $p < .001$). We failed to reject the hypothesis "*The beliefs of teachers' and their students' will be positive about their flipped classroom readiness*." Therefore, it can be interpreted from the findings that secondary school teachers and students are generally ready to apply this model in educational settings.

	M	*SS*	*Sd*	*t*	*p*
Flipped Classroom Readiness (Teacher)	3.843	.56521	.03967	7.386	< .001
Flipped Classroom Readiness (Student)	3.380	.61499	.04316		

Table 3: Teachers' and their students' on flipped classroom readiness (source: own calculation)

When the independent sample *t*-test result given in Table 3 is examined, secondary school teachers flipped classroom readiness demonstrates a statistically significant difference according to the flipped classroom readiness of students ($p < .001$). The hypothesis which stated that *"No significant difference will exist in the students' flipped classroom readiness with the teachers'."* has been rejected. It can be interpreted from this finding that secondary school teachers believe that they have the required competence for applying the flipped classroom in their courses. When the results are examined according to the sub-dimensions, they expressed having a skill of providing students' control, using technology, planning classroom time, doing preparatory work and being open-minded. Thereby, teachers have high readiness for the flipped classroom rather than their students.

Teacher \ Student		Self-directed learning	Technology self-efficacy	In-class communication self-efficacy	Motivation for learning	Doing preview	Flipped classroom readiness
Providing students' control self-efficacy	r	.051	.533**	021	.088	.004	.124
	p	.470	**< .001**	.768	.214	.956	.078
	n	203	203	203	203	203	203
Technology self-efficacy	r	.006	.438**	.076	.012	.007	.039
	p	.936	**< .001**	.281	.866	.922	.585
	n	203	203	203	203	203	203
Self-efficacy for planning classroom time	r	.001	.451**	.045	.040	.048	.019
	p	.992	**< .001**	.528	.575	.499	.784
	n	203	203	203	203	203	203
Readiness for preparatory work	r	.083	.625**	.031	.092	.001	.147*
	p	.237	**< .001**	.659	.193	.985	**.036**
	n	203	203	203	203	203	203
Being open-minded	r	.230	.833**	.139*	.108	.124	.270**
	p	.044	**< .001**	**.048**	.125	.077	**< .001**
	n	203	203	203	203	203	203
Flipped classroom readiness	r	.065	.696**	.014	.061	.018	.143*
	p	.359	**< .001**	.846	.390	.800	**.042**
	n	203	203	203	203	203	203

Table 4: The relationship between teachers' and students' flipped classroom readiness in terms of their sub-dimensions (source: own calculation)

The results of the correlation analysis show that there was a positive relationship between teachers' providing students' control self-efficacy and students' technology self-efficacy. Based on the results, it was understood that when the teachers can provide their students' with control, their students have more technology self-efficacy. The flipped classroom is a technology-based model in which students take their own learning responsibility by using technology. However, this model doesn't reduce teachers' duties to facilitate their learning process. We can say that a good facilitator teacher gives his students encouragement to use technology in their learning. Moreover, for a successful implementation of the flipped classroom, teachers must use technology as well as students. The results of the implemented analysis confirmed a *positive* relationship between teachers' and their students' technology self-efficacy ($r = .438$, $p < .001$).

Flipped classroom model, which is based on the integration of technology with education, expects teachers and learners to use the technology in learning environments at the highest level. We can understand from the results that teachers play critical role for this issue. On the other hand, it was found that teachers' competence for planning the classroom time had a *positive* effect on students' technology self-efficacy. The success of implementation flipped classroom depends on a planned and well-organized classroom time. At that point, teachers are supposed to work as a maestro to plan their students both out of class learning and metacognitive activities. A well-planned classroom increases students' motivation, they learn more on their own by using technology. In addition, there was a *positive* relationship between teachers' readiness for preparatory work and students' technology self-efficacy and flipped classroom readiness. In the flipped classroom model, students are required to watch online lectures and study the subject before coming to the class (Baker, 2012). The teacher controls their learning process and guides them to be responsible. To achieve this, the teacher is required to prepare an online environment and to provide strong interaction for students (Evseeva and Solozhenk, 2015).

Contrary to popular belief, this model gives more duty to teachers than students. That's why it isn't surprising that if teachers are ready to work hard, students will always be ready. The flipped classroom has recently become popular and is one of the newest learning approaches. Teachers are expected to follow new developments in the field of education and be open-minded to apply them in their classrooms. The results of the analysis showed that there was *a good* relationship between teachers' being open-minded and students technology self-efficacy, in-class communication self-efficacy and flipped classroom readiness ($p < .001$; $p = .048$; $p < .001$). Moreover, students' technology self-efficacy, flipped classroom readiness effects positively teachers' flipped classroom readiness ($p < .001$; $p = .042$). We failed to reject the hypothesis that *"There will be a positive relationship between teachers' and their students' flipped classroom readiness."*. It can be interpreted from this finding that flipped classroom readiness of teachers affects their students' readiness for this model *positively*.

DISCUSSION

These days, our world is under the influence of an epidemic, Covid-19. In this regard, face to face education has been interrupted, and distance learning via the internet has recently become popular worldwide. The flipped classroom is one of the newest approaches that gives the opportunity for online education. The urgent need for research has therefore occurred. That's why investigating the teachers' and their students' readiness for this model has vital importance both for the endurance of the teaching and learning process and the economic welfare of the countries.

This study investigate the relationship between teachers' and their students' flipped classroom readiness. The findings of this study show that the flipped classroom readiness of teachers is higher than their students'. The flipped classroom is a teaching method provided through recorded videos outside the classroom (Chuang, Weng, and Chen, 2018; Findlay-Thompson and Mombourquette, 2014; Kong, 2014). To reinforce students' previous learning, teachers plan the classroom time with metacognitive activities, increased analysis, synthesis, evaluation skills (Asef-Vaziri, 2015; Filiz and Kurt, 2015; O'Flaherty and Phillips, 2015; La-Marca and Longo, 2017). The traditional approach puts a barrier in front of teachers to apply higher-order activities due to the limited classroom time. They try to finish the curriculum to prepare students for examinations. However, the flipped classroom claims to eliminate these barriers by carrying the teaching time to home, only practising the lecture in class. Thus, they can find the opportunity to answer the students' needs individually. These issues support the findings of this study. Since it presents various chances to teachers, it isn't surprising that they are eager to apply this model in their classrooms.

It is concluded that providing students' control self-efficacy of teachers affects students' technology competence positively. As it has been known that students' own learning should be planned and evaluated by teachers via some applications such as Kahoot, Moodle etc. or sending some quizzes online, this is a key to success in the flipped classroom. This type of classroom changes the role of teachers by reducing explanation time but increasing stimulating, supporting and advising students. Sharples et al. (2014) emphasized that crucial role of a teachers as a guide for learners rather than teaching the lecture directly. Moreover, Grover and Stovval (2013) highlighted the task of teachers to facilitate the students' learning. These studies confirm that teachers are a prerequisite for successfully implementing flipped classrooms. As found in our study, it is possible to comment that teachers' self-efficacy for providing students' control all the time encourages them to use technology more.

It is observed that there is a *positive* relationship between teachers' and their students' technology self-efficacy. It can be understood that the learners equipped with 21st century competences are only instructed with competent teachers. There is no doubt that 21st century generation is

different from the previous one. As Prensky (2001) said, this generation was born in technology, called *digital natives*. Thereby, it is nonsense to expect them to learn and do homework in traditional learning settings. With the development of the internet and the digital world, the way of accessing and transmitting knowledge has changed. In line with this alteration, putting the students in the centre of the process and making materials available for them is a must. It is agreed that teachers should use the technological equipment at the highest order in their classroom (Filiz and Kurt, 2015) to answer their students' needs.

Throughout the study, it is seen that there is a *positive* relationship between teachers' readiness to take responsibility to make preparations and students' flipped classroom readiness. For an effective flipped classroom, the teachers should take on more responsibility compared to the traditional approach (McLaughlin et al., 2014). They should carry out a role whereby they can organize students' learning by preparing the lecture videos or providing online applications and planning in-class activities that increase the learners' higher-order skills. The time should be reorganized both inside and outside the classroom. Although some people think that this model reduces teachers' duties by giving great responsibility to the students (Filiz and Kurt, 2015), there is an exact opposite situation. At the end of the research, it can be inferred that if a teacher becomes ready to take responsibility for the teaching preparation and learning process, students' flipped classroom readiness will be higher.

This study concludes that there is a *positive* relationship between teachers' open-mindedness and their students' in-class interaction self-efficacy and flipped classroom readiness. Students whose teachers are open to new ideas have more flipped classroom readiness. To achieve this, teachers are expected to follow current approaches in the field of education to keep up with the latest developments. Furthermore, they are supposed to be open-minded to change their teaching habits and apply the new approaches that are suitable for them and their learners.

As a result of the research, it can be stated that being open-minded of teachers give us an idea about their students' flipped classroom readiness. Moreover, this study confirms that the students whose teachers are more open-minded have more in-class interaction self-efficacy than others. Based on this result, it can be commented that since open-minded teachers provide more flexible and relaxed classroom settings, the students can get in touch with each other well in classroom.

Various suggestions can be presented based on the results obtained throughout this research. Some of them are as follows: Teachers should be trained and given more knowledge and information about the model. The more the teacher is informed with this approach the more students benefit. Further studies, research and investigation should be conducted on the model to ensure all teachers use this model. Stakeholders in education should provide the necessary tools and equipment such as computers and the internet for swift implementation of this model. Students should be encouraged to watch the videos and other materials at home to help them understand the content before the lesson in class. In this study, data were collected by means of a scale, but further studies should be carried out with experimental or control groups and applying pre-test and post-test. This study is carried out with secondary school teachers and students. But similar studies should be developed within academic fields in universities. Finally, it is suggested that other subject areas in the field of education which are yet to use the flipped classroom must be encouraged.

CONCLUSION

This research has shown us that teachers' and their students' flipped classroom readiness positively affects each other. However, the flipped classroom readiness of teachers is higher than their students. This model is based on providing online video lectures to learners before class time and expecting them to work and understand the subject prior to coming to class, thus enabling the teacher to reinforce the subject with metacognitive activities such as group discussions, station technique, jigsaw, etc. in the classroom. Thus, teachers can find time to answer students' needs individually. While the flipped classroom has fundamentally changed the traditional role of the teacher in the learning process, its success depends on teachers being facilitators of learners' learning. They are expected to encourage learners' self-directed learning skills and help learners become responsible for their learning. Given that flipped classroom is a technology-based model, teachers have a critical role in maintaining motivation, providing guidance for learners and encouraging them to take responsibility of their own learning. Clearly, these activities specify new roles for teachers that are important factors in the achievement of the flipped classroom. This study shows that teachers are ready to take responsibility and to utilize the opportunities this model provides.

Technology has become an integral part of educational settings and the process of developing education policy by using technology has begun. Technology integrated with teaching and learning process increases the quality of education and changes the ways teachers teach and learners learn. Since the flipped classroom requires the integration of technology and education, in order to achieve this model, teachers and students should have technology self-efficacy. This research has shown us that teachers' skills to use technology affect their students' competence to use technology. Furthermore, the students whose teachers are open-minded, have *more positive* opinions on the flipped classroom. It can be concluded that teachers are a mirror for their students. They reflect back to the teachers what they give.

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CUTTING THE VICIOUS CIRCLE: ADDRESSING THE INCONSISTENCY IN TEACHERS' APPROACHES TO ACADEMIC INTEGRITY BREACHES

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ABSTRACT

A dysfunctional educational system has been identified as one of the causes of academic dishonesty in the Eastern Europe. This paper describes a case study based on data collected at one Czech university (*N* = 660) and presents measures that have been taken at the institution after it. The case study combines quantitative self-reported data and qualitative data from students and teachers with hard data from the disciplinary committee. We analyse cases and types of breaches, identify characteristics of students that incline them toward cheating and investigate some of the reasons why. Our research confirms that the inconsistent approach of teachers is a contributing factor to students' propensity to violate academic integrity rules and identifies reasons for such behaviour. Teachers play a key role in prevention, it is their duty to report cases of suspected misconduct, but they need tools to improve the culture of academic integrity. This paper describes in detail the measures which have been at the given faculty as a solution to the identified problem, the authors believe that the presented measures might serve as an inspiration for policymakers on how to tackle the inconsistency of teachers' approaches to student misconduct.

KEYWORDS

Academic dishonesty, the Eastern Europe, cheating, inconsistent approach of teachers, recommendations for improvements

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Highlights

- *Teachers are inconsistent and rarely report breaches of academic integrity, only 4.5% of teachers act according to the faculty.*
- *With almost half of the teachers, students do not risk anything more than a verbal warning when they use a crib.*
- *Students admit cheating significantly more than what is reported. At the given faculty, there were only five such cases reported in the last three years.*
- *80% of teachers and 95% of students would welcome an academic integrity officer at the faculty.*

INTRODUCTION

For decades, higher education researchers have been interested in understanding students who violate academic integrity rules – how frequently breaches of academic integrity occur (Kiewra, Honz and Kauffman, 2010; Kremmer, Brimble and Stevenson-Clarke, 2007; Newton, 2018; Curtis and Vardanega, 2016), why they occur (McCabe, 2005; Hosny and Fatima, 2014; Curtis and Clare, 2017) and how such breaches might be prevented (Jowanna, 2012; Kolb, Longest and Singer, 2015; Draper, Ibezim and Newton, 2017; Foltýnek and Králíková, 2018). In his recent ethnographic study, Pabian (2015) identifies Czechia's dysfunctional higher education system as a primary cause of student behaviours which could be classified as cheating, but he sees it as a natural and rational response to the educational setting, in which, according to Pabian, its chronic underfunding has resulted in a decline in overall quality. Furthermore, Pabian argues that the underfunding has resulted in a decrease in morale and concern, which further contributes to the problem. Because accreditation agencies focus primarily on the number and

quality of publications, higher education institutions (HEIs) respond by allocating their scarce resources to research rather than teaching. Instructors minimize their efforts devoted to teaching and rely heavily on "frontal instruction" in which education is limited to memorizing encyclopaedic knowledge which is then typically tested via multiple-choice tests. Not surprisingly, students do not see any point in memorizing and do not want to invest their time to do it. Add to this, the collectivistic nature of the Eastern European culture (Mahmud, Bretag and Foltýnek, 2018), and it is no surprise that students copy from each other during examinations (Pabian, 2015), and share test questions together with ready to use crib notes (Stöckelová and Virtová, 2015) to minimize their efforts.

Although we know that this is not true at all courses and at all institutions, we believe that Pabian is largely correct. Walker and Townley (2012) have also observed that HEIs have limited resources to address cheating and that many educators and administrators are reluctant to prioritize academic integrity, believing that effort devoted to cheating detection would divert resources that would otherwise be used to support honest students. 'Decisions about how to deal with cheating can also be decisions about which students will take up most of the time and resources of educators.' (Walker and Townley, 2012: 42). The issue of resource allocation is also addressed with regard to the European context. Weber-Wulff (2014: 15) points out that '[attempts to detect academic ghost-writing] will, unfortunately, increase the time and effort that will have to be invested in reading, grading, and giving feedback'.

THE OBJECTIVE OF THE STUDY

Pabian (2015) identifies the contributing cause of student cheating but did not provide any recommendations for improvements. Our paper goes beyond the identification of the problems and proposes a solution for them - to cut the vicious circle. Teachers play a key role in the prevention of academic misconduct (Gottardello and Karabag, 2020; Chugh et al., 2021). They define educational content, which influences students' motivation, and they set conditions at the examinations. Thus, we chose teachers as the stakeholders best able to cut the vicious circle and we are solving the identified problems through recommendations to them.

In order to formulate the recommendations, we had to gain a more in-depth understanding of the conditions under which students are more likely to cheat and the reasons most likely to lead to such behaviour. It was also necessary to identify how teachers approach students' cheating. Hence, in the first part of the paper, we share the results of this research - a case study of an economic faculty at one Czech university. The case study provides more detailed insight into cheating at written examinations and teachers' reaction to it by examining a unique combination of three datasets collected at this faculty. We combine quantitative self-reported data from students and teachers with hard data from the disciplinary committee that show how many students were found to have violated academic regulations. The second part of the paper describes in detail the measures implemented to cut the vicious circle.

LITERATURE REVIEW

Student assessment

In Czechia, Slovakia, and also in other countries in the Central and Eastern Europe, the written examination is a common method of student assessment (Foltýnek, Rybička and Demoliou, 2013; Glendinning et al., 2013; Glendinning et al., 2017). By written examinations, we mean an event, in which students gather in the classroom for a given period of time and complete a test (including computer-supported written tests, paper-and-pen tests, and examinations with written and oral components). For the faculty, who responded to our survey, approximately 85% of the assessments in compulsory courses in bachelor and master studies are in the form of written examinations (Dlabolová, 2017). For that reason, this paper focuses on cheating in written examinations.

In general, there are two approaches to assess student learning: summative and formative (Brown, Bull and Pendlebury, 2013). Summative assessment gathers information (measures learning outcomes), whereas formative assessment (evaluation) uses this information for personal development (Astin, 2012). Both types of assessment are important. Formative assessment helps in the learning process, the summative assessment allows HEIs to verify that students achieved expected learning outcomes (Astin, 2012). Besides prompting to learn and evaluation of learning outcomes, assessments may also help to motivate learners, help teachers evaluate their teaching methods and have other indicative and regulative functions (Brown, Bull and Pendlebury, 2013; Cox, Imrie and Miller, 2014).

Many researchers agree that formative assessment empowers students as self-regulated learners and, thus, enhances the student learning process (Nicol and Macfarlane-Dick, 2006). Despite that, summative assessment seems to be prevalent in many institutions, especially in the Central European HEIs (Foltýnek, Rybička and Demoliou, 2013; Glendinning et al., 2013). Together with an emphasis on memorizing encyclopaedic knowledge converts exam cheating to a rational choice of students (Pabian, 2015).

The most common types of cheating

There have been many studies on students who breach academic integrity standards, focusing on cheating in general (McCabe, 2005; Nadelson, 2007; Trost, 2009; Miller, Shoptaugh and Wooldridge, 2011; Beasley, 2014; Bretag et al., 2014; Hensley, Kirkpatrick and Burgoon, 2013; Bultas et al., 2017; Fass-Holmes, 2017; Glendinning et al., 2017; Yaniv, Siniver and Tobol, 2017), and on specific modes of cheating including cheating in written assignments (Glendinning et al., 2013; Foltýnek and Rybička, 2013; Gow, 2013; Moore, 2013), contract cheating (Clarke and Lancaster, 2006; Foltýnek and Králíková 2018), and cheating in written examinations (Vonkova, Bendl and Papajoanu, 2017; Pabian, 2015). Bultas et al. (2017) identified sharing the exam questions with other students and copying from other students' tests during an examination as the most common dishonest behaviours. Miller, Shoptaugh and Wooldridge (2011) found that copying from other students was the second most common (23.8% of students admitted they did it at least once) and that the most common form of dishonesty being paraphrasing without

proper referencing (31.3%). Focusing exclusively on business students, McCabe (1997) mentions the following forms of cheating as the most common: "copying few sentences without footnoting" and "working on assignment with others when the instructor wanted individual work" (both 54%). Regarding exam cheating, McCabe (1997) found that "helped others cheat on the exam" is the most common answer (39%), followed by copying from others (without or with their knowledge – 32% and 27% respectively), using a cheat sheet is the least frequent here (19%).

Yardley et al. (2009) found that "copying from another student's assignment" and "allowing others to copy from your assignment" to be the most common types of cheating. Multiple studies, however, found that exam cheating was more widespread. Fass-Holmes (2017) reported that more than half of reported violations of academic integrity within his dataset were exam cheating; The same finding is confirmed by Hensley, Kirkpatrick and Burgoon (2013), who reported that 51.7% of respondents have cheated in an examination.

In studies focused specifically on using cheat sheets during examinations, Bultas et al. (2017) found that 95.7% of the questioned nursing students and 80.9% other students claimed that they never used any form of a cheat sheet. Similar results are from Miller, Shoptaugh and Wooldridge (2011) showing only 4.3% admitted using a cheat sheet on the examination at least once during their studies. Similar findings are significantly older results by McCabe (1997) – from 5% to 10% of students from most study fields at HEIs with honour codes (namely engineering, natural sciences, social sciences and other) self-reported ever using a cheat sheet, in sharp contrast are the results from students of business, where it was self-reported by 19% of students. Many of the above-mentioned numbers and results cannot be compared on a 1:1 basis due to differences in the research setting, methodologies, and specific questions.

Factors influencing cheating in written examinations

There are many research studies investigating the influence of different factors on cheating. Hensley, Kirkpatrick and Burgoon (2013) investigated self-reported data on cheating in relation to gender, course enrolment, and grades among undergraduate students from one US university. A higher level of academic dishonesty was found in the group of students with the lowest grades. The results showed that men confessed more test cheating than women. More cheating men were discovered also by Fass-Holmes (2017). Nevertheless, he based his study on data from reported (any) violations of academic integrity. On the other hand, multiple studies have found no statistically significant relationship between gender and cheating – in self-reported data of students (Ludlum et al., 2017; Miller, Shoptaugh and Wooldridge, 2011), or in self-reported data by alumni (Yardley et al., 2009), or from behaviour within an experiment simulating a written exam (Yaniv, Siniver and Tobol, 2017).

Studies observing the field of study as a factor related to cheating repeatedly show that students of business (and related fields) outnumber other study directions, both in reported incidents of cheating (Fass-Holmes, 2017) and in self-reported cheating (e.g. McCabe, 2005; McCabe and Trevino, 1995; McCabe, Butterfield and Trevino, 2006; Ludlum et al., 2017).

Teachers' attitudes toward student cheating

Findings of Gynnild and Gottschalk (2008) show that 40% of the academic staff responding admitted they had taken no steps regarding a suspected incident of cheating due to insufficient proof. In accordance with these findings, Ramzan, Asif and Adeeb (2018) confirm that only 24% of students believe that their teachers are reporting plagiarism cases to the disciplinary committee, whereas 32% think that their teachers are tolerant of plagiarism and do not report the cases.

Foltýnek, Rybička, and Demoliou (2013) compared students' and teachers' attitude to plagiarism. They found differences in sources of information, in reasons leading to plagiarism and in the main students' difficulties regarding academic writing. Both agreed on easiness to cut and paste from the Internet as a primary reason. After that, teachers accused students of laziness, lack of skills and not perceiving plagiarism as wrong, but students reported time pressure and inability to cope with the workload. Teachers were also found harsher in the judgment of different plagiarism scenarios.

Peytcheva-Forsyth, Aleksieva and Yovkova (2018) examined the impact of technology on various assessment methods. Their results showed a significant gap between the prevalence of plagiarism and ghost-writing reported by students and teachers. Teachers suspect students to commit these offences much more frequently. Bjelobaba (2018) tried to enhance the knowledge about academic integrity among students and teachers at the University of Gothenburg in Sweden. The survey was later used to develop new approaches to work with the academic staff in their skill development, e.g., an e-course, workshops, seminars, as well as modules on academic integrity in different courses and courses in the supervision of students.

A study by Swansea University researchers (Ransome and Newton, 2018) has found that university staff shows a varied understanding of student academic integrity. One of the consequences is that teachers do not report violations of academic integrity (Bjelobaba, 2018) even though all cases of suspected academic dishonesty must be reported immediately to the disciplinary committee. According to the Academic Integrity Office of Baylor University (2019), 'Reporting cases of academic integrity violations is important since it could be possible that the student has demonstrated similar behaviour in other classes. If the violations are not reported, then that pattern of behaviour may continue'.

Solutions to students' cheating

Many previously mentioned papers focus only on investigating the problem of student cheating but miss the "so what" part. The aim of our paper is to describe the problem and to propose a solution. There are various approaches to improve academic integrity practices and designing academic integrity policies. According to Bretag et al. (2011: 7), '[a] policy needs to provide an upfront, consistent message, reiterated throughout the entire policy, which indicates a systemic and sustained commitment to the values of academic integrity and the practices that ensure it'. Wright, Jones and Adams (2018) developed (based on their data research and

current and relevant literature) the following recommendations which could have the most merit or potential for improving academic integrity: interrogate the dominant paradigm of success, redefine the grading system, define and communicate academic integrity definitions and policies, faculty training, start early, teach writing and promote moral development.

MATERIALS AND METHODS

Two questionnaires (one for teachers and one for students) were used for collecting self-reported data at an economic faculty at one Czech university in January 2017, using a structured anonymous questionnaire survey (containing mainly multiple-choice questions).

Questionnaire for teachers

The questionnaire for teachers aimed to confirm our observation of everyday faculty life that teachers are inconsistent in handling students' misconduct. The questionnaire contained the most common scenarios, which came out of our long-term experience and the most common assessment methods used at the faculty. Teachers were asked to either choose one of the pre-defined options or write down their own response. The questionnaire contained four sections: written examinations, citation ethics, student projects and demographic information. In the end, teachers were offered to write down their own comments. The questionnaire was piloted by five members of the faculty. After that, all teachers at the faculty were requested by an e-mail to fill in the questionnaire. The anonymity was ensured. Out of 150 teachers (including full-time, part-time employees and PhD students), 88 responded, which gives the response rate of 58.7 %. Regarding the number of respondents, descriptive statistics were used to evaluate the results. Teachers had an opportunity to add a comment to each question and an overall comment for the entire questionnaire. All comments helped us to understand the teachers' motivations and attitude.

Questionnaire for students

The preliminary analysis of teachers' data showed inconsistencies in the teachers' approach. It was obvious that common recommendations for teachers would be needed. We also wanted to know the attitudes, opinions, and demands of the students. We created a questionnaire for students using the same scenarios, its main purpose was to find out the opinions of the students about appropriate outcomes for various forms of cheating.

The questionnaire was piloted by ten individuals before it was released. All students of the faculty were asked by an e-mail to fill in the questionnaire. In addition, the link to the form was shared via the official faculty Facebook group. No further promotional activities were carried out. Participation was voluntary and all respondents were assured about the anonymity of the survey. Out of approximately 3,000 students, 660 participated in the survey.

The student questionnaire was divided into six sections, the first three were based on the same sections of the teacher's questionnaire (using the same scenarios but asking from students' point of view). Section four contained questions focused on students' own experience with cheating. This section contained the most important questions for this study: "Have you ever prepared an unallowed aid for the written exam? (yes / no)", and "If yes, have you used it? (yes/no)". Section five contained questions focused on appropriate outcomes of breaches. Section six contained demographic questions.

Students had an opportunity to provide additional comments at the end of the questionnaire; 94 respondents provided quite extensive comments containing a lot of information. Hence, we also decided to perform an analysis of these (qualitative) data. Two independent teachers and researchers (with different experience and cultural background) in the field of academic integrity went through the text comments looking for some common patterns in them. They independently identified four groups of comments sharing characteristics and which comments belong to each of them (with few comments belonging to more groups at the same time, and few not relevant to any of them).

Hypotheses

In order to identify the characteristics of the most often cheating students, we used statistical analysis for data from the student's questionnaire. The questions "Have you ever prepared an unallowed aid?" and "If yes, have you used it?" were used to identify the cheating students. In the Results section, we merge both questions as "I have prepared and used an unallowed aid". We wanted to examine significant differences between students' cheating and individual factors like age, gender, degree of study and study program. The idea behind this identification was that it might help us to better target our recommendation for the teachers.

We aimed to test the following null hypotheses:

- H1: There is no dependence between the study program and students' cheating.
- H2: There is no dependence between gender and students' cheating.
- H3: There is no dependence between the degree of study and students' cheating.
- H4: There is no dependence between age and students' cheating.

The χ-square test and p-value were used to test statistical significance. The answers of some students had to be excluded from the analysis because they did not specify the study program, gender, type of study or age. That is the reason why the number of answers for each hypothesis differs. Some students did not provide age, or they mentioned an unreasonable one-digit age.

Data from the Disciplinary Committee

Given the above-mentioned datasets, we know what percentage of students admit using crib notes at examinations. We also know what percentage of teachers report these cases to the disciplinary committee. We wanted to verify these self-reported data by the data about the real cases of academic misconduct, hence we used data from the Disciplinary Committee of the faculty.

According to the Czech Higher Education Act (Act No. 111/1998 Coll., 2018), the Disciplinary Committee is a body dealing with academic integrity breaches of students. The

disciplinary procedure is initiated by the Dean of the faculty based on the motion which can be proposed by anyone. If a student is found guilty, the Czech law allows only four possible outcomes: no sanction, warning, conditional expulsion from studies and immediate expulsion from studies. In order to formulate the recommendations, we needed to understand which categories of students violate academic integrity most often. Thus, we were interested not only in overall numbers but also in the demographic structure of students facing disciplinary procedures. The third dataset (N = 19) contains an anonymized list of all disciplinary cases handled in the three-year period before January 2017, i.e., calendar years 2014, 2015 and 2016. For each case, we got basic demographic data of the student (gender, age, field of study), description of the breach, and outcome. This anonymous dataset was obtained from the study department of the faculty, which is responsible for handling the disciplinary cases, organization of hearing and keeping all students' records.

RESULTS

We start this section by presenting the results from the teacher survey to show the inconsistency in ways how they handle students' breaches of academic integrity. Then we present a call for an academic integrity advisor, which is shared by both students and teachers. We follow by sharing the quantitative self-reported data from the student survey complemented by hard data from the disciplinary committee. We finish with qualitative data about what students are calling for.

Evidence of teachers' inconsistency

The data from the survey confirmed that teachers solve breaches very differently. Only a small percentage has initiated disciplinary procedures against serious breaches of academic integrity, which is well visible in the gap between students self-reporting cheating and the number of cases from the disciplinary committee.

In the questionnaire, we asked teachers what they would do in several model situations during a written exam. In all of them, the inconsistency of teachers is visible. We describe in detail the question dealing with using an unallowed aid: "During a written exam, you catch a student using a crib note, which contains information relevant for a given course, but none of them is useful for the particular exam. What will you do?". There were answers from all 88 respondents, the results are displayed in Table 1.

Answer	%	*N*
I expel the student from the exam, and I record "F".	39.77%	35
I ask the student to hide the crib.	34.09%	30
I expel the student from the exam without any record.	9.09%	8
I take the crib. (answer proposed by multiple respondents)	5.68%	5
I expel the student from the exam, record "F" and inform the disciplinary committee.	4.55%	4
I pretend not to see it.	2.27%	2
I mark the exam as there was no crib, but I will inform the disciplinary committee.	1.14%	1
It depends on the particular situation. (answer proposed by one respondent)	1.14%	1
Other (different answers proposed by the respondents)	2.27%	2

Table 1: Answers to the question "During a written exam, you catch a student using a crib note, which contains information relevant for a given course but none of them is useful for the particular exam. What will you do?"

Almost 40% of teachers (N = 35) answered "I expel the student from the exam, and record "F". The same number of teachers would ask the student to hide the crib note or take the crib note by themselves (merging the second and fourth row in the table as they lead to the same result). As the crib note is a "pre-prepared cheating behaviour", then only 4.5% of teachers (N = 4) answered, "I expel the student from the exam, record "F" and inform the disciplinary committee." act correctly.

The teachers (N = 8; 9%) who answered, "I expel the student from the exam without any record." actually act against university regulations, also the option "I mark the exam as there was no crib note, but I will inform the disciplinary committee." chosen by one teacher is not supported by any university regulation. Two teachers (2.3%) would simply pretend not to see it. One of the "Other" answers was: "I would be interested in who is the author of the crib note. If it was perfectly prepared and the author was the student, I would let him finish the exam. If he wasn't the author, I would just exclude him from the exam term." This is quite an original approach, nevertheless, it does not comply with university regulations either. From a different point of view on the answers, we can sum up all answers where there are no consequences for the student when a crib is discovered by a teacher: with 37 out of 88 teachers, students do not risk anything more than verbal warning when they use a crib note.

The teachers' self-reported data confirmed our suspicion that teachers were inconsistent in addressing academic integrity issues. This observation was further confirmed by the hard data from the disciplinary committee and by some research (De Maio, Dixon and Yeo, 2019; Harper et al., 2018; De Maio, 2015). The reasons for such teachers' behaviour are well described in the five-factor model that includes these factors: Emotionality of teachers, Denial by students, Fear of students' revenge, Guilt and time-consuming Difficulty (Keith-Speigel et al., 1998).

Demand for Academic Integrity Advisor

Analysing the teachers' questionnaire, on the question "I would welcome (at the department or faculty level) someone I could turn to in such situations" 19.5% (N = 17)

answered "No", 52.9% (N = 46) answered "Yes, someone who would provide me with some advice", and 27.6% (N = 24) answered "Yes, someone to who I would hand over the case". From the overall comments, two participants mean that handling of integrity breaches cannot be unified, and such a solution would just mean additional bureaucracy, one of them directly stated: "Trying to capture every situation and set up a process defining every situation, and everyone will not do any good." However, the percentage of positive answers sends a clear message that teachers want someone to solve the academic issues for them, or at least provide advice.

A similar question was posed to students: "I would welcome (at the department or faculty level) someone I could approach if I did not agree with the outcome for my breaches.", 95% (N = 625) of students answered "Yes". They referred to this question in the overall comments, e.g., "Certainly, it would be good if there were some 'mediators' between students and teachers who would solve, for example, students' complaints about teachers. Students are at a considerable disadvantage compared to teachers and if they do not like something, they do not really know who to turn to…" Given that almost all students agreed with this statement, we did not perform any additional statistical analysis.

Answers to the question "I think the procedures in these situations should be consistent at the level of:" are in Table 2. It is well visible that roughly two-thirds of teachers and two-thirds of students would welcome unified rules (at least) on the level of faculty. Students referred to this question in the overall comments (classified as into the group "fairness"), e.g., "Certainly it would be good if there were universal recommendations on how to proceed." There is also notable agreement in teachers' and students' responses; The correlation coefficient of their answers is 0.89.

	Teachers	Students
Teacher	8.04% (N = 7)	8.52% (N = 56)
Course	26.43% (N = 23)	18.87% (N = 124)
Department	4.60% (N = 4)	5.48% (N = 36)
Faculty	29.89% (N = 26)	30.14% (N = 198)
University	17.24% (N = 15)	22.98% (N = 151)
Czech Republic	2.30% (N = 2)	8.98% (N = 59)
European Union	8.05% (N = 7)	2.13% (N = 14)
Whole world	3.45% (N = 3)	2.89% (N = 19)

Table 2: Comparison of teachers' and students' answers on the question "I think the procedures in these situations should be consistent at the level of:"

Self-reported students' behaviour

Overall, 660 students' responses were included in the analysis. Out of them, 68% were bachelor students and 32% master students. Considering gender, there were 43% of men and 57% of women. There were students from all study programs provided at the faculty (52% of Economics and management, 25% of Public policy and administration, 14% of System engineering and informatics and 9% of Engineering informatics). All percentage values correspond with the actual distribution of students by degree, age, and study program at the faculty.

Out of the 660 students, 340 (52%) reported having ever prepared an unallowed aid. In most cases (264, i.e., 78%) it was a small piece of paper with notes. Roughly half of those who prepared them (specifically 190, i.e., 56%) reported having used them. This section presents the relationship between the basic demographic data (study program, gender, degree of study and age) and student intent to cheat.

Dependences / Values	Chi-Square Statistic	p-value	N-value
Study program versus using an unallowed aid	6.94	0.07	650
Gender versus using an unallowed aid	16.50	< 0.001	653
Degree of study versus using an unallowed aid	18.01	< 0.001	655
Age versus using an unallowed aid	38.68	< 0.001	614

Table 3: Results of the statistical tests for null hypotheses

H1: *There is no dependence between the study program and students' cheating.* Although there was a higher degree of students' cheating in the study program of Engineering Informatics, based on the obtained p-value we cannot reject the null hypothesis H1 (p = 0.07, N = 650).

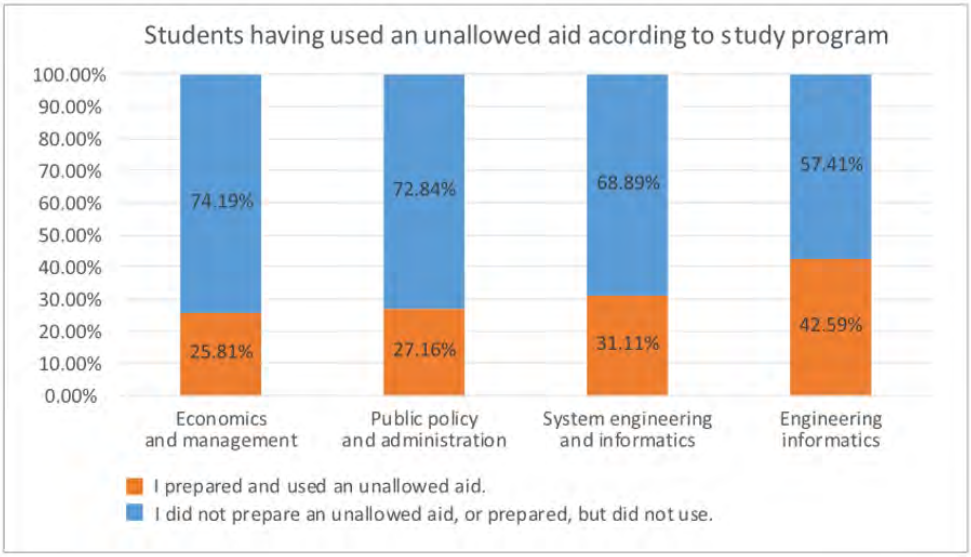

Figure 1: The influence of the study program on the students' cheating

H2: *There is no dependence between gender and students' cheating.* Based on the calculated *p*-value ($p < .001$, $N = 653$), the null hypothesis H2 was clearly rejected. We can declare that there is a dependence between gender and students' intent to cheat. A more detailed analysis of the data shows that men are more likely to prepare and use unallowed aids in written tests than women.

	Men	Women
I prepared and used an unallowed aid.	36.88%	22.37%
I did not prepare an unallowed aid, or prepared, but did not use it.	63.12%	77.63%

Table 4: The influence of gender on the students' cheating

H3: *There is no dependence between the degree of studies and students' cheating.* The calculated *p*-value ($p < .001$, $N = 655$) allows us to reject the null hypothesis H3. We can say that there is a dependence between the type of study and students' cheating. A more detailed analysis of the data shows that master students report preparing and using unallowed aids for written tests more often than bachelor students - see Table 5. Higher percentages of positive responses from older students could be expected because they simply had more opportunities for doing it, as shown in the examination of H4.

	Bachelor's degree	Master's degree
I prepared and used an unallowed aid.	23.95%	40.20%
I did not prepare an unallowed aid, or prepared, but did not use it.	76.05%	59.80%

Table 5: The influence of the degree of study on the students' cheating

H4: *There is no dependence between age and students' cheating*. Based on the calculated *p*-value ($p < .001$, $N = 614$), the null hypothesis H4 was therefore rejected. We can, therefore, say that there is a dependence between age and students' cheating.

A more detailed analysis of the data shows that with increasing age students more often report having used unallowed aid for the written examination. As the chart shows, the percentage of such students grows from 5.26% to 47.06%. Tymula et al. (2012) have found that younger students are biologically predisposed to be more tolerant of unknown outcomes and less bothered by stated risks than their older peers. However, our research confirmed that master students report intent to cheat more often than bachelor ones. This increase can be explained by the longer time of study and the longer stay in the community of students. Our opinion is supported by Carrell, Malmstrom and West (2008) who measured how peer cheating influences individual cheating behaviour. According to their results, students in communities where cheating is tolerated easily succumb to pressure over time and cheat more. It is harder for them not to cheat for fear of losing social status. When examining the development of this trend, there is an interesting increase of 19.5 percent points between the age group of 18–19 and 20. Another significant increase of 19.5 percent points is between the age group of 23 and 24. Based on this, we assume that the unallowed aid is prepared most often by students aged 20 and 24 years.

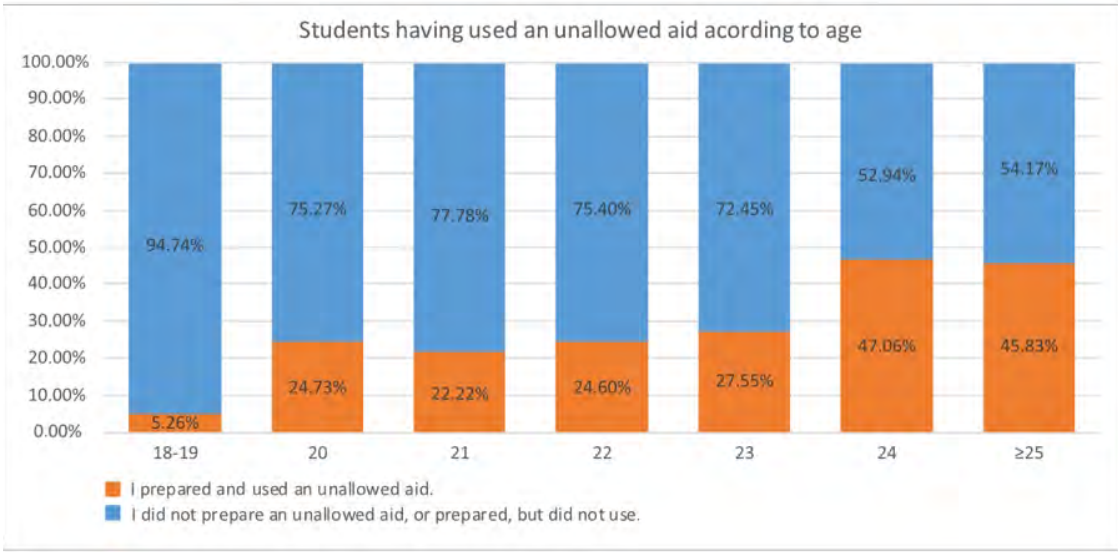

Figure 2: The influence of age on the students' cheating

The students' self-reported data indicate that cheating does not depend on the study program. It depends on age and consequently the level of study (McCabe and Trevino, 1997), but this can be explained by the nature of the survey items. As we asked whether students ever prepared an unallowed aid, it is obvious that these numbers are increasing in relation to age. Even though students from economic study programs self-report their cheating behaviour to the same extent as their computer science peers, their cases are much less reported to the disciplinary committee.

Confirmation of self-reported results: Data from Disciplinary Committee

In the given time period, i.e., between 2014 and 2016, the hearings of 19 students were conducted:

- 5 cases of cheating in written examinations,
- 3 cases of unallowed copying and/or dissemination of test items,
- 9 cases of plagiarism in assignments,
- 2 cases of plagiarism in master thesis.

All of the students were found guilty of having committed a violation of study regulations and in each case, a sanction was applied. Out of the 19 students, 8 were warned, 10 were conditionally expelled and 1 was expelled immediately for serious plagiarism in his master thesis. The relationship between the type of breach and outcome is summarized in Table 6. As we can see, the severity of the outcome corresponds to the severity of the breach.

Type of breach	Warning	Conditional expulsion	Immediate expulsion	Total
Exam cheating	5	0	0	5
Copying/dissemination of test items	2	1	0	3
Plagiarism in assignment	1	8	0	9
Plagiarism in thesis	0	1	1	2
Total	8	10	1	19

Table 6: Types of breaches and their outcomes

Out of the 19 cases, 11 (58%) were men and 8 (42%) were women. These statistics are consistent with the findings from the anonymous questionnaire, which indicated that men tend to cheat more often than women. The relationship between gender and type of breach is summarized in Table 7.

Type of breach	Male	Female	Total
Exam cheating	2	3	5
Copying/dissemination of test items	1	2	3
Plagiarism in assignment	7	2	9
Plagiarism in thesis	1	1	2
Total	11	8	19

Table 7: Types of breaches and their gender distribution

As we can see, in terms of exam cheating, the proportion of male/female is almost equal (taking a very small sample into consideration), but male students are more often engaged in more severe breaches, namely plagiarism in the assignment. Out of the 19 students, 14 were bachelor students and only 5 of them were master students. This also corresponds to the number of students in different age groups, which are summarized in Table 8.

Age group	19	20	21	22	23	24	≥25
Number of students	1	4	6	2	1	3	2

Table 8: Number of cases according to the age groups

We can see a prevalence of the age group of 21 over the other age groups. Students at the age of 21 are most likely in their final year of bachelor studies. The distribution between bachelor and master students contrasts with findings from students' self-reports.

Study program	Number of students	Observed percentage	Expected percentage
Economics and management	9	47.37 %	48.37 %
Public policy and administration	1	5.26 %	23.91 %
Systems engineering and informatics	4	21.05 %	15.22 %
Engineering informatics	5	26.32 %	12.5 %

Table 9: Number of cases according to the study program

Table 9 shows the distribution of cases handled by the disciplinary committee by the study program (Observed percentage). Expected percentages (the percentage of students who presumably cheated) were calculated based on the number of cheating respondents from a given study program. Students of Public policy and administration are under-reported, whereas students from both computer science study programs are reported more often. This again confirms that teachers are inconsistent and underlines the need for unified faculty-wide recommendations.

Reasons that lead students to cheat

We investigated the reasons leading students to the preparation of an unallowed aid. There were three predefined choices (I did not study at all / I studied, but I was not sure by my knowledge / I was learning by preparation of the cheat sheet / Other). Almost half of the students (47%), who answered this question, were not sure of their knowledge. About one third (32%) answered they learned by preparation of unallowed aid. The rest of the answers were Other, mostly criticizing the form of lecturing or the form of the exam. Some students explained that the cheat sheet was used for the most complicated formulas only and they did not see any point in memorizing them. The same opinion appeared in the overall comments on the questionnaire: Multiple students stated that examining irrelevant information is a valid excuse for using a cheat sheet, e.g.: "Personally, I used an aid only in an extreme case, such as exhausted or absurd claims for the exam/subject. That is the only admissible exception."

What are the students calling for?

During the analysis of the qualitative data (text comments), students were divided into four groups according to what they wrote as their main demand:

- Group "fairness": students calling for unified and fair treatment of academic breaches from all teachers ($N = 14$).
- Group "strictness": students calling for enforcement - teachers should pay more attention during the examinations (or in other discussed situations) and for imposing stiffer penalties ($N = 12$).
- Group "quality": students calling for better teaching and relevant examinations. They are angry that the information they are being tested upon is sometimes outdated, sometimes not relevant to their field or comparable with what is considered cutting edge in other places, and that the testing methods do not reflect what they have learned or are not at all manageable ($N = 16$).
- Group "gratitude": students giving positive feedback on the survey in general. They appreciate that the faculty is interested in their opinion and dealing with the issue ($N = 8$).

There were four answers which were classified to belong to more than one group. The rest of the answers contained other comments which were not classified in any of the group – students commenting on some of the questions, describing their experience, etc. The urge of students for a change – for more quality and more fair teaching was well noticeable.

DISCUSSION

It is always important to start from clear and transparent policies and procedures that are easy to follow (Bretag et al., 2011). Our findings showed that the faculty particularly needs (1) to raise awareness of the academic integrity issues and proper procedures for their handling; (2) to provide teachers with resources they might need to correctly handle the academic integrity breaches. To raise awareness of the academic integrity issues, the faculty has established a position of an Academic integrity coordinator. Moreover, teachers were provided with a manual on handling student breaches as well as with forms and other links making reporting of student misconduct easier.

Manual for Teachers

When preparing the manual for teachers, we have used information from both students' and teachers' questionnaires. We addressed these problems acknowledging that we have no chance to influence the overall educational setting, which Pabian's (2015) identified as an incentive to student cheating. As the student self-reported cheating behaviour is not dependent on the study program, we could design the manual independently from the study program. However, the manual should be implemented more rigorously in cases such as that of the teacher of economic study programs, who under-report

students' cheating. In accordance with Bjelobaba (2018), we would like to remind teachers that it is their duty to report cases of suspected misconduct, but also to give them the tools to improve the culture of academic integrity in their classes and the university at large.

The manual is based on the solid data provided by students and teachers questionnaires. It starts with a distinction between minor offence (coming mostly from lack of knowledge) and major offence (deliberate cheating) (Tennant, Rowell and Duggan, 2007). Offences coming from lack of knowledge are in the competence of teachers and should be handled within a course. Cases of deliberate cheating should be reported to the disciplinary committee. The manual provides detailed advice on the prevention of academic dishonesty as well as procedures for handling cases of misconduct (Glendinning et al., 2013). They address the following topics: 1) Written examinations; 2) Written assignments; 3) Projects; and 4) Final theses.

The recommendations for examinations contain preventative measures including vigilance by more than one person, clear explanation to students what is allowed and what is not and a predefined seating plan. Then, they suggest procedures for handling unallowed aids and unallowed communication between students. The recommendations on written assignments contain preventative measures, e.g., necessity of ongoing consultations, using text-matching software, new topics each year and the necessity to present essays (Curtis and Vardanega, 2016). Then, the manual describes procedures for handling unintentional and deliberate plagiarism, incorrect citations, and suspicion of contract cheating. Similar recommendations on prevention apply also to student projects. Suggested procedures deal with collusion and contract cheating. Special attention is devoted to bachelor and master theses. The recommendations on the theses combine those from assignments and projects and provide advice on how to identify plagiarism, how to distinguish minor and major offence and how to handle them. The manual was approved by the faculty management. As such, it is not legally binding, but it complements and further explains the legally binding regulations.

Academic Integrity Coordinator

Many institutions in the UK, USA or Australia benefit from Academic Integrity Officers (AIO), who handle cases reported by teachers. Research shows that teachers should not be left to manage discipline by themselves. It is more effective if the staff is supported by school management (Sullivan et al., 2014). According to the Academic Integrity Office of Baylor University (2019), teachers play a critical role in creating a climate of honesty, trust, fairness, respect, and responsibility. Most teachers say that disciplining students is one of the toughest parts of their job (Sullivan, 2017). Both students' and teachers' data indicate that this concept would be welcomed by our faculty as well. In our sample, 95% of students and 80% of teachers were calling for establishing a dedicated person who would either deal with the cases or at least provide advice. Based on this finding, the position of Academic Integrity Coordinator (AIC) was established. He is responsible for:

- Raising awareness of academic integrity issues;
- Providing advice to the teachers;
- Regular revision of the recommendations for teachers;
- Organization of training events for students and teachers;
- Information on the academic integrity web page.

Students can approach him if they think that their teachers are violating academic integrity rules or do not agree with the teacher's decision.

Website on Academic Integrity

To communicate academic integrity issues, a special section was established on the faculty web pages. All relevant documents (regulations, Code of Ethics, the Recommendation document) are available from one place as well as a template for reporting cases to the disciplinary committee and contact information of the academic integrity coordinator. Moreover, the most important findings from teachers' and students' surveys are communicated as an infographic. Even though students were not our primary target group, all materials are available for them as well. Students can learn how the processes work; they can read anonymized reports from the Disciplinary Committee meetings and see how teachers are expected to handle the breaches.

Limitations

Regarding the limitations of our research, one of them is the self-reported data of teachers and students. Although all the questionnaires were anonymous, people may under-report undesirable behaviours even when they cannot be identified. The anonymity of the questionnaire survey carries another risk. The Google Form tool does not have unique links, so in practice, this means that anyone can fill in this questionnaire more than once. However, we do not expect people would do it to the extent which would affect the overall results. There is also quite probable bias caused by the self-selection of the students. It is possible that mainly students, who are concerned by the situation and who are calling for changes, filled in the questionnaire and used the opportunity to write the comment. The question "Have you ever prepared/used an unallowed aid for the written exam?" could also have been misunderstood by students. For the future, it can be replaced by the question "Have you ever prepared/used an unallowed aid for a written exam at this university?", or even limit the time frame e.g., to the last 6 months.

CONCLUSION

We acknowledge Pabian's (2015) paradigm of the dysfunctional education system in Czechia. In such a system, cheating behaviours are a natural and rational response of students and not reporting these cases are a rational response of teachers. No matter what the external causes are, there is no doubt that this educational setting cannot work, and students are unlikely to achieve desired educational outcomes. The aim of this paper was not only to better understand how a flawed system encourages students to cheat but mainly to propose appropriate recommendations for what the teachers and policymakers at the university level can do to mitigate the harm, even in less-than-ideal circumstances.

In this case study, we showed that teachers are largely inconsistent in the way they handle academic integrity

breaches committed by students. Both students and teachers do not like this inconsistency - two-thirds of respondents call for unification of procedures and penalties at least on the faculty level. Both students and teachers also call for a person who can advise them about the issues related to academic integrity. From the questionnaire results (N = 660), we also found out that the male students self-report cheating behaviours more often than their female counterparts. Despite the fact that self-reported cheating does not vary across study programmes, computer science students are more often being sent to the disciplinary committee, which confirms inconsistency in teachers' approaches.

Based on the data obtained from the anonymous questionnaires and the disciplinary committee, and with regards to the scientific literature, we proposed the measures aiming to address the teachers' inconsistency and help to build a culture of academic integrity at our faculty. We believe that the position of academic integrity coordinator and clearly specified recommendations in the form of a manual for teachers can help improve the situation. If teachers follow the manual, they should be more consistent in addressing academic integrity violations, which should send a positive message to students. In 2021, we plan to conduct a follow-up survey in order to find out the impact of these new recommendations and approaches.

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EXPLORING THE TEACHERS' PERCEPTION TOWARDS EDUCATIONAL INCLUSION: A STUDY OF TEACHERS' IN PUNE, INDIA

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ABSTRACT

In India, changes in legislation and policy have increased the number of students with disabilities enrolled in higher education. The purpose of this study was to investigate university teachers' perceptions towards inclusion of students with disability public and private universities in India. The study examined how age, gender, educational levels, years of teaching experience, and frequency of interaction with a person with a disability influence instructors' views about people with disabilities and their inclusion at public and private academic institutions. Data was collected through a digital questionnaire from private and public universities in Pune, India. The population of the study comprised of full time University teachers' (under-graduate, post-graduate and doctoral courses) in Pune. The survey was completed by 309 university teachers. Descriptive statistics, independent sample *t*-test and ANOVA were used to examine the data. The researchers found no statistically significant relationships between teachers' perceptions of inclusion in regards to degree level, gender and years of experience. The study did, however, discover a statistically significant relationship between teachers' perceptions of inclusion and their interaction with students with disabilities. Academic and social outcomes of students with disabilities are significantly enhanced when inclusive approaches are used. Goals for future research are discussed.

KEYWORDS

Inclusive education, India, students with disabilities, teacher, university

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Highlights

- *In this research, teachers' opinions of inclusion were shown to be unaffected by their degree level or years of experience in this study.*
- *Male teachers are more positive towards inclusion of students with disabilities than female teachers.*

INTRODUCTION

The right to education is a crucial component of ensuring equal rights and academic inclusion for children with disabilities. In India, Equal Opportunities Protection of Rights and Full Participation Act (1995) defines "Person with Disability" (PWDs) as any person that is suffering from at least 40 % of disability and is certified by a medical authority for the same (Ministry of Law, Justice and Company Affairs, 1996: 248). The following types of disabilities and their definitions are specified in Section 2 of the above-mentioned Act-1995: blindness, person with low visibility, Leprosy-cured person, hearing impairment, locomotion related disability, mental illness, and mental retardation.

At global front, The United Nations Convention on the Rights of Persons with Disabilities is an international human rights treaty aimed at protecting the rights and equality of people with disabilities. United Nations 17 Sustainable Development Goals recognizes 'quality education' as an instrument for world peace and prosperity, and expects a strong commitment by all stakeholders (from developing and developed countries) to provide education for all boys and girls (United Nations, n. d.). The Indian government has been working to close the gaps in their education system in order to create a strong system of inclusive education in the country. The statute must be interpreted in connection with Chapter V of the Persons with Disabilities

Act, 1995, when it comes to schooling for a disabled kid. Every child with a disability has the right to a free education until they reach the age of eighteen, according to Chapter V of the PWD Act (Singh, 2016). Importantly, every child with special needs (CWSN), regardless of the kind, category, or severity of their disability, is entitled to a meaningful and high-quality education under The Right of Children to Free and Compulsory Education (RTE) Act, 2009 (Bose, Ghosh and Sardana, 2017). The Rights of Persons with Disabilities (RPwD) Act 2016 defines inclusive education as a 'system of education wherein students with and without disabilities learn together and the system of teaching and learning is suitably adapted to meet the learning needs of different types of students with disabilities' (Ministry of Human Resource, 2020: 26). The National Education Policy 2020 (NEP) of India has been hailed as a major milestone in instructional leadership. One of the National Education Policy's 2020 goals is to ensure the inclusion and fair representation of children with disabilities in India's educational system. From the foundational stage to higher education, children with disabilities will be able to completely engage in the normal schooling process. This proposed legislation is fully compliant with the requirements of the RPwD Act 2016 and promotes all of its provisions for school education.

While inclusion is still commonly followed in India's education system, teaching and non-teaching employees are unaware of how important it is for them to be aware of an inclusive academic atmosphere. Sarkar (2020) examined the National Education Policy 2020 (NEP) implications for children with disabilities about choice of school- special, regular, or home-based education. It was children with disabilities may be enrolled in neighbourhood schools under the 2012 RTE amendment, which also acknowledges a separate category of children with severe disabilities who may choose home-based education. The RPWD (2016), on the other hand, recognises that children with developmental disabilities have the right to attend either neighbourhood or special schools of their choice. While a range of policies have been developed and adopted to solve problems relating to education for individuals with disabilities, these strategies are insufficient, and all of these interventions must be scaled up. Unless the nature of their impairment precludes them from being appropriately served in a general education classroom setting, students with disabilities should get their education in a general education classroom setting.

In India, the survey of persons with disabilities (National Sample Survey 76th round in 2018) conducted in rural and urban households, reported that among persons with disabilities of age 15 years and above, 19.3% had highest educational level as secondary and above (Ministry of Statistics & Programme Implementation, 2019: 1). A total of 106 894 people with disabilities were surveyed in this study (74 946 in rural areas and 31 948 in urban areas). The report also suggested that 62.9% of individuals with disabilities (aged 3 to 35 years) have never attended a regular school. There are just 8 449 students with disabilities among the 1 521 438 students enrolled in 150 colleges and universities across the country, accounting for 0.56% of all students (PTI, 2015). According to the National Center for Promotion of Employment of Disabled Peoples' third edition survey, 74.08% of these were males and 22.7% were females.

One of the most valuable advantages of education is the ability to develop labour market skills of individuals with disabilities to become financially self-sufficient. The exclusion of adolescents with a disability from educational institution is not only a moral and social problem, but it also has a negative impact on national economic development (Banks and Polack, 2014). Phillipa Thomas (2005) in her feature, "Mainstreaming Disability in Development: India Country Report" asserts that poverty is one of the leading factors and effects of disability. There are many social and economic costs associated with disabilities, which differ depending on the individual's situation as well as the form and severity of their condition. A person's disability has not only an effect on the family's way of living, but it also establishes a variety of economic costs in a particular country. A person with disability must pay additional costs to turn an amount of income into a quality of life compared to that of an individual without disability (Raut, Manoranjan and Bharati, 2014). For people with disabilities, education and acquiring new skills are the only way to overcome poverty, register better participation in labour market and make their own space in the society.

The world of knowledge is undergoing scientific and technological transformation, and sizeable shift has been noticed in curriculum bridging the gap between the current state of learning outcomes and what is required must be adaptable, creative and multidisciplinary. It's critical to study national and international studies on regular teachers' attitudes on inclusive education. Regular classrooms should create an environment to cater students from all backgrounds, especially student with disability. Academic inclusion is largely dependent on teacher training, attitude, and reporting of children with special education needs, as well as the instructional tactics employed (Mag, Sinfield and Burns, 2017). The adaptive abilities of classroom teachers are one of the primary turning points in achieving an inclusive school environment. To function in an inclusive classroom, teachers must understand individual disability features, teaching strategies, and personal qualities in order to provide a stimulating learning environment (Bukvić, 2014). Accessible and flexible curriculum can aid students of all capacities in learning content, while also encourage teachers' to change their teaching methods (Imaniah and Fitria, 2018). Apart from equipping teachers with skills, knowledge, and understanding, one of the most difficult aspects of teachers' preparation for inclusive practise is ensuring the development of favourable attitudes toward children with disabilities and their inclusion in regular classes (Forlin, 2010). The National Education Policy (NEP) addresses numerous facets of teachers' education, training, and service conditions that are important for children with disabilities (Sarkar, 2020). Short-term specialist courses for teaching children with disabilities, as well as modules on teaching children with disabilities within current programmes, are among these options. Recognizing the important role teachers may play in improving learning outcomes by reforming pedagogy, the NEP 2020 empowers teachers to choose suitable pedagogy and encourages them to ensure their students' socio-emotional learning, which is an important element of holistic development (Chari, 2020).

Teachers at all levels of academic pyramid must be at the centre of education changes because they are the ones who will mould our next generation of achievers. Teachers in collaboration with governmental organizations are providing high-quality educational opportunities for all students, regardless of their social, bodily or economic circumstances. Faculty attitudes are thought to be one of the most important elements in students with disabilities achieving academic success and completing their university degree (Reynolds and Hitchcock, 2014). Children with disabilities receive a variety of specialised services tailored to their needs during their school years, but the situation changes radically once they enter the university system, where they are expected to be self-determined and advocate for their own needs (Lombardi and Murray, 2011). Although students with disabilities may be provided with accommodations, higher education institutions do not adjust the pedagogical objectives or intellectual stimulation. It's not unexpected that students with disability have a hard time shifting and adjusting to educational settings. Students with disabilities encounter challenges on both ends of the spectrum. Rather than a school, a university is a platform for higher education. Students at the institution concentrate on certain areas, and knowledgeable specialists deliver lectures. From high school to college is a significant step in a student's life, and while there is a short transition period between the two, the student's life changes dramatically. This will also provide significant learning chances for them to become a contributing member of the workforce with the necessary knowledge and abilities. Importantly, while most students attending universities have a smooth transition, students with disabilities having difficulties adjusting to new academic environments. University faculty members are taking all necessary steps to meet the demands of high-quality education by implementing various teaching techniques for students with impairments who are unable to meet the learning obstacles. For example, Students' knowledge of their disability, learning strengths and limitations, career decision–making skills, and preparedness for the higher demands of postsecondary education must all be addressed in transition specific interventions (Janiga and Costenbader, 2002).

According to several surveys, teachers' attitudes for inclusive education vary from one country to another country. For example, teachers' attitudes toward inclusive education are said to be more negative in non-western countries. Many variables continue to influence the attitude (positive, negative or neutral) of teachers in India toward inclusive education progress. Such variables are teachers' age (Kumar and Midha, 2017; Bhatnagar and Das, 2013; Parsuram, 2006), gender (Dash et al., 2019; Kumar and Midha, 2017; Kumar, 2016; Bhatnagar and Das, 2013; Parsuram, 2006), years of experience (Kumar, 2016; Bansal, 2016), qualification (Bansal, 2016; Sharma, Moore and Sonawane, 2009; Parsuram, 2006), and teachers who had a contact with a person with a disability (Parsuram, 2006). Some authors discovered good attitudes about students with impairments (Costea-Barlutiu and Rusu, 2015; Reynolds and Hitchcock, 2014; Abu-Hamour, 2013), their learning capacity, and their integration into university life, while others discovered negative attitudes toward students with disabilities (Kalyva, Gojkovic and Tsakiri, 2007). Various countrywide studies investigating Indian teachers' (both school and universities) attitudes toward students with disabilities and their involvement in mainstream settings found mixed results. In India, teachers' training is insufficient, particularly when it comes to providing inclusive education for all children (Bindal and Sharma, 2010). A research of 480 pre-service teachers participating in a Bachelor of Education (B.Ed) programme at Pune University examined pre-service teachers' views and concerns about implementing inclusive education (Sharma, Moore and Sonawane, 2009). Participants in the research expressed relatively unfavourable opinions and a moderate level of worry about the inclusion of students with impairments. In a study of 470 regular school teachers in Delhi, Bhatnagar and Das (2013) found that teachers expressed a moderate degree of concerns about implementing inclusive education in their schools. Similarly, another study conducted in western state of India where the study's main conclusion was that Ahmedabad instructors were relatively worried about incorporating students with impairments in their classes (Shah et al., 2014). Kumar (2016) performed a research to explore the attitudes of university and school teachers about inclusive education. He found that university instructors had a positive attitude toward inclusive education than school teachers.

The main goal of this quantitative study is to examine the university teachers' perception of including students with disability in the public and private universities of India. Another objective was to look into the relationship between educators' perspectives toward inclusion and various demographic factors. The study also like to find out;

(a) Do teachers' educational backgrounds have an impact on their views on inclusion?

(b) Do teachers' years of teaching experience have a significant role in their perspectives about inclusion?

(c) Do teachers' perspectives on inclusion differ based on whether they are male or female?

(d) Is there a difference in teachers' opinions on inclusion depending on the type and frequency of interaction they have with persons with disabilities?

To answer the research questions, the following null hypotheses were developed:

H1: There is no significant difference between the teachers' perspective about inclusion and their highest educational qualification.

H2: There will be no significant relationship between teacher perspectives about inclusion and years of teaching experience

H3: There is no significant difference in perception between male and female university teachers

H4: There is no significant difference between teachers' perspective about inclusion and teachers' had contact with people with disabilities and teachers' with no contact.

METHODOLOGY

Sampling Technique

Pune city forms the urban heart of the eponymous Pune Metropolitan Region, together with the municipal corporation borders of Pimpri-Chinchwad Municipal Corporation and the three cantonment towns of Camp, Khadki, and Dehu Road.

With a diverse spectrum of educational institutions, the city of Pune is recognised as the Oxford of the East. The researcher conducted an internet search to determine which universities were located in the study area offering undergraduate, post graduate and PhD courses. Within the targeted metropolitan region, there were a total of 1 public university and more than 10 private universities. A multi-stage sampling approach method was utilized to choose the sample and participants for the study: purposive and simple random sample techniques. Seven universities were chosen using the purposive sampling selection technique from a pool of public, deemed, and private universities. A basic random sample procedure was used to pick participants for the study. The participants comprised of Professors, Associate Professors and Assistant Professors in universities and university affiliated colleges.

Instrumentation

The instrument used in this study based on teachers' attitudes towards inclusion scale was originally developed by Ernst and Rogers (2009) and later adopted by Carmen Celestine Wiggins (2012) for her doctorate degree. There were two components of the instrument that participants completed. The demographic and background information was collected in the first portion of the questionnaire. This section of the questionnaire was created based on previous researches. The researcher gathered demographic data by conducting a quick survey to obtain the following information: age and gender of the participant; years of teaching experience; grade level taught (UG/PG/M. Phil/PhD); highest education level; type of professional and personal experience with disabilities; and contact with students with disabilities.

The instrument's second element was a scale that gathered teachers' opinions regarding inclusion. Participants then responded to 27 items on a Likert-type questionnaire. The scale was adapted from Wiggin's (2012) study on teachers' perceptions of inclusion, which used a 7-point Likert scale, but it was changed to 5-point Liker scale, while retaining all the original information and to simplify data analysis. The scale asked participants to indicate how much they agreed or disagreed with the statement by selecting one of five options: Strongly Agree (SA), Agree (A), Neutral, Disagree (D), and Strongly Disagree (SD). Several scholars have looked into the topic of different response scale formats and their equivalence. The adoption of a 5-point scale instead of the original 7-point scale should have little impact on the reliability and validity of the results. Lazar (2010) conducted a study to examine spirituality and job satisfaction among female Jewish Israeli hospital nurses, used a 5-point Likert scale with comparable anchors (1, strongly disagree and 5, strongly agree) instead of original scale of a 7-point Likert scale. In the same study, it was also reported that there was no considerable effect on the reliability or validity of the instrument. Research with this instrument showed acceptable reliability and validity (Ernst and Rogers 2009, Wiggins, 2012). The instrument used in the study had Cronbach's coefficient alpha of 0.92 reported by the researchers.

Participants

A total of 675 surveys were distributed to the participants and 309 (45.7% response rate) were returned. Over the course of four months, this study was performed employing a digital questionnaire on Google Forms. A cover e-mail outlining the survey's goals, including background information, the study's objective, and survey completion instructions. It also contained the link for digital survey form. Potential responders were told that participation was completely voluntary and that the information they provided would be kept private and confidential. For performing research, the researcher looked at various university/college websites to gather contact information for teaching faculty. When the researchers couldn't find the participants' contact information on the respective website, they turned to LinkedIn and Google search option.

Three hundred and nine academicians responded to the online poll. There were 49.8% males and 50.2% females among the 309 participants (see Table 2).

The years of experience of the participants are listed in Table 3. For University faculty, the highest percentage of participants (32.7%) were in the 6–10 year experience category.

The majority of educators with PhDs were among those who responded (See Table 4).

Demographic Factor	Respondents Age Subgroups	Frequency	Percentage
Age in years	19–25 years	0	0
	26–35 years	92	29.7
	36–45 years	156	50.5
	46–55 years	33	10.7
	56 years above	28	9.1

Table 1: Age of the respondents (source: own calculation)

Demographic Factor	Respondents Subgroups	Frequency	Percentage
Gender	Male	154	49.8
	Female	155	50.2

Table 2: Gender of the respondents (source: own calculation)

Demographic Factor	Respondents Subgroups	Frequency	Percentage
Teaching Experience in years	Less than 1 year	8	2.6
	1–5 years	98	31.7
	6–10 years	101	32.7
	11–15 years	62	20.1
	16–25 years	34	11.0
	Over 26 years	6	1.9

Table 3: Teaching experience of the respondents (source: own calculation)

Demographic Factor	Respondents Subgroups	Frequency	Percentage
Highest Qualification of the respondents	Bachelor's Degree	6	1.9
	Master's Degree	88	28.5
	PhD	209	67.6
	M.Phil	6	1.9

Table 4: Highest qualification of the respondents (source: own calculation)

61 of the 309 University teachers' have a friend or relative who has some kind of the disability. 7 participants identified as a man or woman with a disability. 165 participants confirmed that "*I have worked with pupil with disabilities as a teacher counselor or volunteer*"**.** A thorough examination of the data revealed that 41 teachers had no contact with people with disabilities. From remaining participants from the same group, 102 teachers reported no direct contact with student with disabilities, 72 teachers reported direct contact at least once a week, and 94 university teachers usually have daily contact with students with disabilities.

Data Analysis

Data were analyzed using IBM SPSS Statistics 20. Descriptive statistics, ANOVA, and Independent samples *t*-test were performed to analyze the data.

RESULTS AND DISCUSSION

The purpose of this study was to learn about university teaching staff perspectives on including students with disabilities in the classroom. In addition, the current study looked into whether university teachers' perceptions of inclusion are influenced by the number of years they've taught, their gender, their highest educational level, and their experience with students with disabilities. Frequency distributions were used to have a better knowledge of the sample and the characteristics of the participants.

Differences between degree level and teachers' perspectives about inclusion

RQ1: Do teachers' educational backgrounds have an impact on their views on inclusion?

The above research question is based on the teachers' perspective about inclusion and highest educational qualification of teachers. The null hypothesis for this question will be

H1*: There is no significant difference between the teachers' perspective about inclusion and their highest educational qualification.*

To analyse this hypothesis, normality has been tested by using Kolmogorov-Smirnov test, ANOVA test has been applied to compare the means of four educational qualifications i.e., bachelor's degree, master's degree, MPhil degree and PhD. Table 5 represents the test of normality by using Kolmogorov-Smirnov test, the result suggested that there is normality in bachelor's and MPhil degree as the value of $p > 0.05$. Data is normally distributed for these two educational qualifications. Rest two are master's degree and PhD, the result shows the p values are insignificant for master's and PhD degree holders. So that there is no normality in data for these two educational qualifications.

Highest Educational Qualification		Kolmogorov-Smirnov		
		Statistic	df	*p*-value
Teachers' Perspective about Inclusion	Bachelor's Degree	.215	6	.200
	Master's Degree	.267	88	< .001
	MPhil	.180	6	.200
	PhD	.304	209	< .001

Table 5: Test of normality (source: own calculation)

	Sum of Squares	df	Mean Square	*F*	*p*-value
Between Groups	4.663	3	1.554	1.147	.330
Within Groups	413.124	305	1.355		
Total	417.786	308			

Table 6: ANOVA test (source: own calculation)

Furthermore, ANOVA has been applied as there are four types of educational qualifications, table 6 represents that there is no significant difference in between group mean as *p*-value is less than 0.05. Therefore, the null hypothesis for this research question can't be rejected. There was no significant difference between degree level and teachers' perspectives about inclusion. These findings show that teachers' views toward inclusiveness are unaffected by their educational background.

International and domestic literature review helped to investigate and understand teachers' perspective about inclusion and their highest educational qualification. Prakash (2012) in the research titled, *Inclusion of Children with Hearing Impairment in Schools: A Survey on Teachers' Attitudes*, reported that teachers' with higher qualifications were more oriented toward inclusive education than their colleagues with lower educational credentials. The probable reason cited as individuals who have just graduated and are highly qualified have had more exposure to educational reform ideas and, as a result, are more open to notions like inclusive education. Antonak et al., (1995) in their study explained that teachers with greater educational degrees were shown to be more averse to integration.

To assess the relationship between years of teaching and teachers' perspectives about inclusion.

RQ2: Do teachers' years of teaching experience have a significant role in their perspectives about inclusion?

The second research question is based on the teaching experience and teachers' perspective about inclusion. The null hypothesis will be

H2*: There will be no significant relationship between teachers' perspectives about inclusion and years of teaching experience.*

To analyse this hypothesis, normality has been tested by using Kolmogorov-Smirnov test, ANOVA test has been applied to compare the means of experiences as less than one year, 1–5 years, 6–10 years, 11–15 years, 16–25 years, 26 years and above. Table 7 represents the test of normality by using Kolmogorov-Smirnov test, the result suggested that there is normality in less than a year experience as *p*-value is greater than 0.05. The other experiences are 1–5 years, 6–10 years, 11–15 years, 16–25 years and 26 years and above having normality in data as *p*-values are less than 0.05.

Furthermore, ANOVA has been applied as there are different groups in experiences and table 8 represents that there is significant difference in between group mean as *p*-value is less than 0.05. Therefore, null hypothesis for this research question is rejected. Furthermore, to check which group mean is different from other, Post hoc ANOVA has been applied. The result depicted two subsets in table of homogeneous subset (post hoc test) which represents that there were two subsets can be drawn. The first subset is having groups such as 26 years and above, 11–15 years, 6–10 years, 1–5 years and less than 1 year; and second subset is having 11–15 years, 6–10 years, 1–5 years, less than 1 year and 16–25 years. Both subsets are found insignificant which shows that there is no significant difference in means of these two subsets.

Years of Experience		Kolmogorov-Smirnov[a]		
		Statistic	df	*p*-value
Teachers' Perspective about Inclusion	Less than a year	.241	8	.193
	1–5 years	.276	98	< .001*
	6–10 years	.297	101	< .001*
	11–15 years	.433	62	< .001*
	16–25 years	.367	34	< .001*
	26 years and above	.365	6	.012*

Table 7: Test of normality (source: own calculation)

	Sum of Squares	df	Mean Square	*F*	*p*-value
Between Groups	17.670	5	3.534	2.676	.022*
Within Groups	400.116	303	1.321		
Total	417.786	308			

Table 8: ANOVA test (source: own calculation)

There was no significant relationship between years of teaching experience and teacher perspectives on inclusion. These data show that instructors' attitudes toward inclusion are unaffected by their years of teaching experience.

Several studies have found that teaching experience has an impact on teachers' opinions about inclusion of students with disabilities in mainstream schools and University. In a related manner, some researchers found a strong negative relationship between years of teaching experience and attitudes toward inclusiveness, while others found no such link. Prakash (2012) did a study to assess and evaluate instructors' views on the inclusion of hearing-impaired students in Indian schools. A total of 100 regular teachers took part in the study, and they were divided into five groups. When compared to teachers with less work experience, teachers with more than 10 years of experience had a more favourable attitude toward inclusive education. In contrast, teachers with fewer years of teaching experience had more positive attitudes about inclusive education than teachers with numerous years of teaching experience, according to De Boer, Pijl and Minnaert (2011).

Differences in perception between male and female teachers

The next research question is based on the gender-wise teachers' perspective about inclusion.

RQ3: Do teachers' perspectives on inclusion differ based on whether they are male or female?

The null hypothesis for this question will be

***H3**: There is no significant difference in perception between male and female university teachers.*

To analyse this hypothesis, Kolmogorov-Smirnov normality test and independent sample *t*-test has been applied.

The normality test of Kolmogorov-Smirnov reported in table 9 shows that there is no normality in data but coefficients are significant. Table 10 represents the mean difference in perception between male and female teachers; which shows that males are more positive towards inclusion than females as their means value is 2.616 and females' mean value is 2.80 on 5-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly Disagree).

The assumption test, Levene's test value is not significant ($p > 0.05$) that means assumption of independent sample *t*-test is fulfilled. Furthermore, it has been also observed that values are insignificant ($p > 0.05$). Therefore, it can be interpreted that null hypothesis can't be rejected and concluded that there is no significant difference in perception between male and female university teachers.

Gender		Kolmogorov-Smirnov		
		Statistic	df	*p*-value
Teachers' Perspective about Inclusion	Male	.320	154	< .001*
	Female	.252	155	< .001*

Table 9: Test of normality (source: own calculation)

Gender	*N*	Mean	Std. Deviation	Std. Error Mean
Male	154	2.6169	1.20021	.09672
Female	155	2.8000	1.12469	.09034

Levene's Test for Equality of Variances

	F	*p*-value	*T*	df	*p*-value	Mean Diff.	Std. Err.
Equal variances assumed	.727	.395	-1.384	307	.167	-.18312	.13232
Equal variances not assumed			-1.384	305.44	.167	-.18312	.13234

Table 10: Difference in perception between male and female teachers (source: own calculation)

There was no significant difference in the perception between male and female university teachers towards inclusion. In this study, it was found that male teachers were more positive than female university teachers towards educational inclusion but this difference is not significantly considerable. Therefore, it can be interpreted that perception towards inclusion is not being affected by genders of teachers.

As for the literature in relation to gender, the results of studies on teacher beliefs about inclusive education are mixed. According to Otunyo and Ekom-Idorenyin (2020) study, female teachers ordinary secondary school teachers in Nigeria had a less favourable perception toward students with special education needs.

When compared to male instructors, female teachers working in a regular academic context demonstrated a positive attitude toward inclusive education for students with hearing impairment, according to a poll performed in the Indian state of Andhra Pradesh (Prakash, 2012). Another meta-analysis study was undertaken by Orakcı et al. (2016) on the topic of the influence of gender and special education training on attitudes toward inclusion. After analysing the data, it was discovered that gender had no significant impact on attitudes for inclusive education. Main and Hammond (2008) in their study in an Australian University reported, prior to practicum, men pre-service teachers reported statistically substantially greater levels of self-efficacy than female pre-service teachers. Overall, the findings on the impact of teachers' gender were conflicting; some researchers claimed that female teachers have more positive views toward inclusion than male teachers.

Gender did not have a significant effect, according to other researchers. Ernst (2006) investigated the impact of regular education teachers' gender and teaching experience on their attitudes about inclusive education in Connecticut, USA. According to the results of her research, male educators had more favourable affective attitudes about inclusion than female teachers. Similarly, Hussien and Al-Qaryouti (2014) reported that in each component of attitudes (cognitive, emotional, and behavioural intentions), male teacher had considerably more positive views than female teachers.

Differences between University teacher perspectives and social contact with students with disabilities.

RQ4: Is there a difference in teachers' opinions on inclusion depending on the type and frequency of interaction they have with persons with disabilities? The last research question is based on the social contact with disabled people or not and inclusion. The null hypothesis will be as below:

***H4**: There is no significant difference between teachers' perception about inclusion and teachers' contact with people with disabilities and teachers with no contact.*

To analyse this hypothesis, Kolmogorov-Smirnov normality test and independent sample *t*-test has been applied. The normality test of Kolmogorov-Smirnov reported in table 11 shows that there is no normality in data and the cofficients also not statistically significant.

Contact with People with Disabilities		Kolmogorov-Smirnov		
		Statistic	df	*p*-value
Teachers' Perspective about Inclusion	Yes	.338	207	< .001*
	No	.227	102	< .001*

Table 11: Test of Normality (source: own calculation)

Gender	*N*	Mean	Std. Deviation	Std. Error Mean
Yes	207	2.5894	1.18259	.08220
No	102	2.9510	1.09343	.10827

Levene's Test for Equality of Variances

	F	*p*-value	*T*	df	*p*-value	Mean Diff.	Std. Err.
Equal variances assumed	3.292	0.791	-2.590	307	.010	-.36161	.13961
Equal variances not assumed			2.660	215.83	.008	-.36161	.13593

Table 12: Difference in perception between who had contact with people with disabilities and no contact with people with disabilities (source: own calculation)

Table 12 represents the mean difference in perception between who had contact with disabled people and those who had no contact with disabled people; which can be interpreted that those who had contact with disabled people are more positive than those who had no contact as the mean value for those who had been in contacted is 2.58 and who did not have any contact with mean value 2.95 on 5-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly Disagree). Levene's test for equality of variance. The result shows that Levene's test value is not significant ($p > 0.05$) that means assumption of independent sample *t*-test is fulfilled. If assumption is fulfilled then we follow the 'equal variances assumed' and it has been found significant ($p < 0.05$). Therefore, it can be interpreted that null hypothesis is rejected, there is significant difference between teachers' perspectives about inclusion and teachers' having contact with people with disabilities and teachers' with no contact with people with disabilities. More specifically, it was found that University teachers' increased/greater interaction with students with disabilities held more positive attitudes towards their inclusion than their colleagues with less contact with student with disabilities.

Differences in attitudes toward educational inclusion are also influenced by the amount of contact (quality vs. quantity) with students with disabilities. McManus et al. (2010), looked at multidimensional attitudes toward people with intellectual disabilities, as well as the difference in quantity and quality of contact with such minority group. However, it was discovered that higher contact quality was linked to more favourable sentiments. Positive experiences may lead to reduced intergroup anxiety, less animosity, and less avoidance of outgroups, according to past research.

In another study conducted by Brandes and Crowson (2009) in the USA had a total of 190 (male $n = 42$, female $n = 148$) pre-service educators participating in bipolar scale survey. The study's goal was to see if there was a link between pre-service teachers' conservative ideas and discomfort with disability on one hand, and reported unfavorable attitudes toward disabled students and hostility to inclusion on the other. Pre-service educators who report higher levels of social dominance orientation, right-wing authoritarianism, economic and cultural conservatism, and discomfort with disabilities are more likely to oppose inclusion and have negative attitudes toward students with disabilities, according to the correlational findings of this empirical study.

The nature and severity of the disability have an impact on instructors' attitudes as well as their perceptions of educational inclusion. Therefore, many authors have adopted multi-dimensional approach while conducting their research on educational inclusion of students with disabilities and reported how teachers contact with different types of disabilities affected their attitudes. For example, Lipka, Khouri and Shecter-Lerner (2019) evaluated faculty members' views toward students with learning disabilities (LD) at a public university in Israel, and found that faculty members had a substantial amount of contact hold good opinions toward students with LD.

CONCLUSION

One of the core purposes of disability studies was to enhance inclusion literacy among academicians at the school and university level. To students with impairments, teachers must function as mentors and gurus. They must encourage students with disabilities to be self-sufficient and such students should be able to inspire other students through their distinctiveness. The role of a teacher is more than just teaching diversified group of students in a classroom while students take notes. Students with disability benefit from inclusion in regular school because it enriches their learning and improves their outcomes (McLeskey and Waldron, 2011).

The main objective of this study as to examine the university teachers' perception of including students with disability different universities in Pune, India. This study exhibited substantial results with respect to the teachers' qualifications, teaching experience, gender and social contact with people with disabilities. Teachers' opinions of inclusion were shown to be unaffected by their degree level or years of experience in this study.

Because students with all types of disabilities are educated in mainstream education platforms, university educator's experiences with various disabilities has an impact on their opinions. Further research is needed to understand differences

in attitudes. Future research will aim to assess the nature of academicians' attitudes toward inclusion in light of recent reforms to India's National Education Policy, 2020. Despite the growing trend towards inclusive environment in India, little is known about Indian university teachers' views on inclusion of students with disabilities. For this reason, additional research is needed at country level to examine University teachers' attitudes to the inclusion of young children with a disability, as well as some of the factors that may be associated with these attitudes. In India, the majority of research on inclusion is performed at the primary and secondary school level, therefore more study on inclusion at the postsecondary level, i.e. university level, is required.

LIMITATIONS

There are a few limitations to this study. First, because the participants are from a single Indian city, the findings may not apply to other Indian cities. Second, some participants may have offered socially desirable replies that were not exactly their real opinions when self-reported data was gathered.

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Full research paper

EFFICIENCY OF PUBLIC AND PRIVATE SERVICE DELIVERY: THE CASE OF SECONDARY EDUCATION

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ABSTRACT

A current issue is the evaluation of the efficiency of various types of education service providers. This paper aims to evaluate the efficiency of the services of secondary education provided by a variety of types of providers. The evaluation of secondary education is performed on a sample of 26 grammar schools in the Prešov region of the Slovak Republic. The method of data envelopment analysis (DEA) is used. The results of the efficiency of 26 grammar schools in the period 2012-2013 to 2016-2017 showed that grammar schools from the sample established by all providers (public, private, church entity) reached the full efficiency score. By contrast, six grammar schools were evaluated as the least efficient. The evaluation of the set of grammar schools based on the average efficiency score also showed that, from the viewpoint of the types of providers, public grammar schools reach higher efficiency scores, in comparison with church and private grammar schools. These findings expand on the theory of public goods with respect to their production and render valuable information for not only education providers but also creators of regional strategic plans in education policies.

KEYWORDS

Data Envelopment Analysis, efficiency, grammar schools, secondary education, Slovak Republic

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Highlights

- *Evaluation of the efficiency of grammar schools by use of data envelopment analysis.*
- *The evaluation of the efficiency of grammar schools reflects the form of financing and volume of received financial resources.*
- *Comparison of the public and private provision of secondary education failed to arrive at a clear conclusion that would promote any of the forms.*

INTRODUCTION

Efficiency has been a frequently discussed topic over the past few decades also in the public sector. The reasons behind are not only threats, such as deficits in budgets of public-sector organisations, but also public demand associated with an increased interest in the quality of public services provided by public-sector organisations from the viewpoint of citizens in the role of consumers of public services (Christl, Köppl-Turyna and Kucsera, 2020). Under the permanent pressure of the public, these organisations are forced to increase the efficiency of the provision of public services with the aim to secure a long-term existence. As a result, their activities must undergo an evaluation of their efficiency.

Efficiency is defined as extent to which organisation produces a given output, or extent the goals defined by the organisation are fulfilled with least possible use of resources. When evaluating the fulfilment of goals, a more complex approach must be adopted in terms of the provision of public services, namely 3Es, standing for economy, efficiency, and effectiveness (Chan and Lynn, 1991; Lewis and Fall, 2017; López-Torres and Prior, 2020). The reason is that if economy or efficiency are evaluated, effectiveness must also be considered, since it plays a significant role in a complex evaluation (Kaplan and Norton, 2000; López-Torres and Prior, 2020). At the same time, the evaluation of effectiveness is inevitably related to the evaluation of economy and efficiency, since when analysing the extent of the fulfilment of the defined goals, economy and an efficient use of resources must also be taken into account

(Ittner and Larcker, 2003; Kuwaiti, 2004). It must also be said that despite a complex evaluation of economy, efficiency and effectiveness, these criteria may collide (Armstrong, 2015; Florina, 2017).

As a rule, only a specific type of educational providers is considered with respect to the evaluation of the efficiency of educational institutions (Coulson, 2009; Cherchye et al., 2010; Crespo-Cebada, Pedraja-Chaparro and Santín, 2013; Nazarko and Šaparauskas, 2014; Silvernail and Johnson, 2014; Rao, 2015; Mikušová, 2017). Research studies already carried out dealing with the evaluation of efficiency in education on the regional level in the Czech or Slovak Republics focused on various types of secondary schools, however only from the perspective of public providers (Chlebounová, 2019; Mališová and Štrangfeldová, 2020).

Outcome of the present research is evaluation the efficiency of the delivery of educational services by different type of providers (public, private, church entity) with a specific focus on high-school education (grammar schools) in regional context the Slovak Republic. On the theoretical level, the article contributes to the broadening of current knowledge regarding the use of non-parametric evaluation of technical efficiency in public services with respect to the correction of inputs and outputs in the interest of an effective provision of the analysed services secondary education. This paper aims to evaluate the efficiency of the services of secondary education provided by a variety of types of providers. The evaluation is performed at the regional level on a sample of 26 grammar schools in region of in the Slovak Republic Prešov. The authors of the paper intend answer the research question (RQ), which stems from theoretical bases of the delivery of public services and results of studies performed in the given area. RQ: *Are efficient grammar schools in the Prešov region related to the particular type of education providers (a public, private, church entity)?* A research question is suited for exploratory research, because the relationships between variables efficiency and various types of education service providers are more uncertain.

The paper is divided into six parts. The first part is introduction, which presents the given topic in broader context from the perspective of the efficiency of public services, followed by theoretical background and overview of literature on the topics of efficiency of education and efficiency of secondary education. The third part describes the applied method and data used. The fourth part presents the results about the evaluation of the efficiency of grammar schools in the Slovak Republic using the example of the Prešov region and renders suggestions and measures for the least efficient schools. The next part is discussion, where the results are discusses in a wider context. The last part is conclusion, which summarises the obtained outcomes and offers a theme for further research.

Literature review

Efficiency is defined as the relationship between the quantity of inputs in an implementation or a process, and the quantity of outputs (Florina, 2017). Efficiency and effectiveness pursues the relationship between inputs, outputs and outcomes (Mihaiu, Opreana and Cristescu, 2010:133). The higher is the result (output) obtained in terms of prescribed resources (inputs), the greater is the efficiency of an activity (Afonso, Schuknecht and Tanzi, 2003: 8).

Efficiency can be evaluated in various areas of economy. Education represents an area of the public sector. The sector of education includes schooling at schools at all levels and in similar facilities that are partly or fully funded from public resources. In general, it is impossible to define which educational services fall under the public sector and which do not, because systems of education vary across countries and so does the range of educational services that are covered from public resources (Stiglitz and Rosengard, 2015).

Over the past years, approaches towards the evaluation of efficiency have been increasingly discussed in the sector of education (Lockheed and Hanushek, 1994; Bohm and Bohmova, 2016; De Witte and López-Torrez, 2017; Johnes, Portela and Thanassoulis, 2017; López-Torres and Prior, 2020). Educational efficiency is frequently confused with educational effectiveness, and at times the two terms are (inappropriately) used interchangeably. Educational effectiveness is whether or not a specific set of resources has a positive effect on achievement and, if so, how large this effect is. Clearly, since effectiveness does not directly compare resource uses or costs, what is effective is not necessarily what is most efficient (Lockheed and Hanushek, 1994: 2). Thus, in the context of education, efficient use of resources (be that financial or the innate ability of students) occurs when the observed outputs from education (such as test results or value added) are produced at the lowest level of resource; effective use of resources ensures that the mix of outcomes from education desired by society are achieved. It is efficiency (rather than effectiveness) of education (Johnes, Portela and Thanassoulis, 2017: 331).

Educational institutions are seen as multi-product organisations producing an array of outputs from various inputs (Johnes, Portela and Thanassoulis, 2017: 332). According to a number of authors, the efficiency of educational institutions is a currently discussed topic (Nazarko and Šaparauskas, 2014; Mikušová, 2017; Agasisti and Zoido, 2018). Besides, there are different views on the evaluation of efficiency in education. Meričková et al. (2020) dealt with measuring and evaluating of the performance of secondary education in the Slovak Republic and proposed possible performance indicators in terms of public grammar schools.

Also other authors (Ferro and D'Elia, 2020; De La Hoz, Zuluaga and Mendoza, 2021) address the question of measuring efficiency in education from a variety of perspectives. Cordero-Ferrera, Pedraja-Chaparro and Salinas-Jimenez (2008) focused on different possibilities of measuring efficiency in the education sector, aiming to define the most appropriate model for the evaluation of schools. De Witte and López-Torres (2017) carried out an extensive review of literature on the topic of efficiency in education, summing up selected variables and adopted approaches toward the evaluation of efficiency in education.

A number of research studies deal with the efficiency of secondary education in European countries. Aristovnik and Obadić (2014) researched technical efficiency of secondary education in the EU and OECD countries. The results confirmed that technical efficiency in secondary education differs

significantly across the majority of the analyzed countries. Dincă et al. (2021) evaluate the efficiency of the education sector using a sample of 28 EU countries. An evaluation of allocation and technical efficiency was performed at different levels of education. Based on the results, the authors state that "old" member states reach a higher efficiency score compared to "new" member states. Agasisti and Zoido (2018) measured the efficiency in 8,000 schools in 30 countries (using PISA indicators). Following the results of the performance of high schools in 36 countries using PISA indicators, Cordero et al. (2018) also came to the conclusion that there exists a higher heterogeneity between countries than between schools. Differences between schools are ascribed mainly to economic indicators and cultural values. Other authors (Sarrico and Rosa, 2009; Henriques and Marcenaro-Gutierrez, 2021) offer an image of the education system by evaluating the efficiency of secondary education in selected countries. In particular, Henriques and Marcenaro-Gutierrez (2021) concentrated on the performance of high schools in Portugal, considering the variation of different indicators. The findings indicate that an average efficient public school reaches an average score, but is still below the OECD average.

A significant aspect that is reflected in the evaluation of efficiency at high schools is the manner of financing and the total volume of received financial resources with respect to the achieved results (Afonso and Aubyn, 2006; Agasisti, 2014; Bohm and Bohmová, 2016; Gavurova et al., 2017). Agasisti (2014) and Gavurova et al. (2017) evaluated the efficiency of public expenditures on secondary education in European countries and the quality of education by use of PISA indicators. Evaluation of education efficiency is associated also with the fulfilment of education goals in relation to an efficient use of public resources (Maresova and Kuca, 2019; Opletalova, Novakova and Balaban, 2019).

As regards other authors, Haelermans and De Witte (2012), for instance, assessed the impact of innovation in education on secondary school performance in the Netherlands. Their results confirm that innovation in profiling, teaching, processes and education chains is significantly related to efficiency, whereas innovation in higher qualification of teachers has an insignificant effect on schools' efficiency.

In a broader context, the efficiency of secondary education is analysed also in relation to competition between schools. Bradley, Johnes and Millington (2001) calculated the technical efficiency of all secondary schools in England in the period 1993-1998 on the basis of a range of outputs (execution of exams and visit rate). The results indicate that competition correlates with efficiency. The results also showed that competition is a significant determinant of changes to efficiency in time. Holmberg (2017) performed the measurement of relative efficiency of high schools in Sweden in the period 2006-2007 through 2015-2016 by means of stochastic frontier analysis. The significant factors were the impact of competition on the school performance and relative efficiency of public and independent schools. Also Agasisti (2013) did research into the evaluation of efficiency in relation to competition, using the example of schools in Italy. The results showed that competing schools reach higher performance and better results.

In connection with the efficiency of secondary education, other authors have examined the efficiency of public and private schools (Waldo, 2007; Millimet and Collier, 2008; Cherchye et al., 2010; Rao, 2015) or efficiency of charter schools (Silvernail and Johnson, 2014). Millimet and Collier (2008) analysed whether competition amongst public schools influences the efficiency in which these schools operate. The obtained findings suggest that there are unresolved interactions between competition, efficiency and finances of school. Waldo (2007) states that the evaluation of efficiency in Swedish public high schools at the local level is affected by competition and local policies. However, the author is of the opinion that efficiency of private schools is unrelated to competition. Cherchye et al. (2010) suggested additional criteria (efficiency and equity) for private (but publically funded) and public schools in Belgium (Flanders) to compare the performance of different school types. Their approach includes considerations, for obtaining "fair" performance comparisons in the public sector context.

The given topic provides an approach to the evaluation of the efficiency of secondary education (grammar schools) from the viewpoint of various providers in the regional context of the Slovak Republic. This view on the efficiency of secondary education (grammar schools) is significantly related to not only the manner schools are funded, but also an outline of competition conditions between the individual types of schools. In the economic environment, the aim of non-price competition is to attract demand with methods other than price (Mankiw, 2009). In the present case, secondary schools (grammar schools), when identical educational services are offered by various providers of education (public, private, church entities), apply methods of non-price competition, such as increased quality of education or innovation of educational services. The use of this competition between schools motivates the schools to increase efficiency.

MATERIALS AND METHODS

Data

Data from the Statistical Office of the Slovak Republic from the years 2012-2019 were used to document the number of schools (grammar schools) by type of education authority in the regions of the Slovak Republic. The database for the evaluation of efficiency is represented by secondary data obtained from the report on educational activities over the period of five school years, 2012-2013 to 2016-2017. The chosen time period for evaluating the efficiency of schools is influenced by the availability of data for all analysed variables at the time of study processing. The sources have been chosen from selected statistics and databases of the Slovak Republic. Specifically, data are drawn from the Register of Schools and School Facilities, School Reports, Eduzber (collection of data for the purposes of normative financing), Management Reports, the NÚCEM data portal, the INEKO (Institute for Economic and Social Reforms) primary and secondary schools portal and the Statistics of the Center for Social Affairs and Families.

The paper is focused on the evaluation of complete secondary general education (upper secondary), which according to Act no. 245/2008 Coll. (National Council of the Slovak

Republic, 2008) "*applies to the successful completion of the last year of at least a four-year and a maximum of eight years of the grammar school educational programme*". The research sample are selected grammar schools in the Slovak Republic, specifically in the Prešov region. According to the European Commission/ EACEA/Eurydice (2020: 2) and Act no. 245/2008 Coll. (National Council of the Slovak Republic, 2008), a grammar school "*is a general, internally differentiated secondary school which educates pupils in 4-year, 5-year or 8-year educational programmes and provides upper secondary general education ISCED 344. Educational programmes of grammar schools focus particularly on preparation for study at higher education institutions; they may also prepare for the pursuit of some activities in public administration and culture*".

For the research, 26 grammar schools have been chosen with three different education providers in the Prešov region. These grammar schools are located in the cities of the Prešov region. The grammar schools have been selected on the basis of random selection. At least one representative was selected for each city, provided it had its data published and available. Greater representation of grammar schools is seen in large and regional cities, such as Prešov. The set of grammar schools includes public (state), private and church four-year grammar schools. Public grammar schools (**Pu**), a total of 15, established by the Prešov self-governing region (region), eight grammar schools established by church or a church community (**Ch**), and three grammar schools which represent private establishers (**Pr**). See Table 1 for more details.

School	Education provider	Municipality
Grammar school JIRASKOVA 12 BJ	public	Bardejov
Grammar school LIPANY	public	Lipany
Grammar school J. A. RAYMAN PO	public	Prešov
Grammar school T. VANSOVA SL	public	Stará Ľubovňa
Grammar school DR. C. DAXNER VT	public	Vranov nad Toľou
Grammar school GIRALTOVCE	public	Giraltovice
Grammar school GEN. L. SVOBODA HE	public	Humenné
Grammar school SNINA	public	Snina
Grammar school J. F. RIMAVSKY LE	public	Levoča
Grammar school P.O. HVIEZDOSLAV KK	public	Kežmarok
Grammar school MEDZILABORCE	public	Medzilaborce
Grammar school KUKUCINOVA PP	public	Poprad
Grammar school SABINOV	public	Sabinov
Grammar school DUKL. HRDINOV	public	Svidník
Grammar school STROPKOV	public	Stropkov
Private grammar school BJ	private	Bardejov
Private grammar school PP	private	Poprad
Grammar school SUKROMA SPOJENA SKOLA PO	private	Prešov
Grammar school SV. MONIKA PO	church	Prešov
Evangelical grammar school - EV. SPOJ. SKOLA PO	church	Prešov
Grammar school SV. J. ZLATOUSTY HE	church	Humenné
Church grammar school SV. MIKULAS SL	church	Stará Ľubovňa
Grammar school SV. MIKULAS PO	church	Prešov
Grammar school SV. F. Z ASSISI LE	church	Levoča
Grammar school CIRKEVNA SPOJENA SKOLA HE	church	Humenné
Grammar school P.P. GOJDIC PO	church	Prešov

Table 1: Set of grammar schools in the Prešov region (source: INEKO, 2020a)

Input and output indicators have been selected to evaluate the efficiency of grammar schools. Input factors: the number of teachers per 100 students and Contribution to one student per school year. Output factors: Rate of students admitted to universities and University admission success rate (see Table 2).

The input and output indicators in this paper have been taken from the official database INEKO (INEKO, 2020b, 2020c). A certain limitation in connection to the applied output indicators is the admission rate of applicants to universities abroad. This the admission rate of applicants is not monitored in terms of individual secondary schools in Slovakia. However, we do not consider it serious limitation, because the total percentage of all applicants from all schools who manage to study at universities abroad accounts represent only 17% (OECD, 2018).

The results of the correlation analysis using Pearson's correlation coefficient (Cohen et al., 2013) have shown relations between input and output values in the period 2012-2013 to 2016-2017. A low to medium correlation can be seen between the input values in the evaluated years (maximum value of 0.44); a medium to strong correlation between output values (maximum value of 0.67); and a negative low to medium correlation between input and output values (maximum value

Variable	Description	Unit	Source
Inputs			
Number of teachers per 100 students	The number of teachers per 100 students at the school. For the purposes of this indicator, internal teachers, external teachers and teachers of practical subjects are considered. Numbers are tracked as of September 15th of the respective school year.	number	School portal INEKO
Contribution to one student per school year	The volume of financial resources at the school's disposal for one year. The sums are provided in the amount per student and per school year, beginning with respect to the year defined.	euros	School portal INEKO
Outputs			
Rate of students admitted to universities	The share of secondary school graduates accepted to at least one university in the following school year in Slovakia against the total number of graduates.	percentage	School portal INEKO
University admission success rate	The share of secondary school graduates accepted to at least one university in the following school year in Slovakia against the total number of candidates who applied for a at least one university.	percentage	School portal INEKO

Table 2: Input and output variables of the analysis (source: INEKO, 2020b, 2020c)

of -0.49). A medium to strong correlation was only observed between output values in the evaluated period. However, both output indicators are considered necessary for the following analysis of the efficiency of schools by use of the DEA method, which is the reason why none of the output indicators has been excluded.

Methods

The present research applies the method of data envelopment analysis (DEA) for evaluation of technical efficiency of public services in the education sector. DEA is among the most frequently used non-parametric methods in the evaluation of technical efficiency of production units. The evaluation of the efficiency of the given production unit renders the efficiency regarding the transformation of its inputs to outputs relative to other units. Unlike the usual calculation of efficiency (productivity) rate, the DEA method applies mathematical programming, which enables the inclusion of a vast amount of inputs and outputs in the model. Unlike the ordinary calculation, the weights are variable and set to maximise the relative efficiency rate of the evaluated unit against the other units (Cooper, Seiford and Zhu, 2011; Dlouhý, Jablonský and Zýková, 2018; Melecký, Staníčková and Hančlová, 2019).

Efficiency is expressed by the transformation process of inputs to relevant outputs. For the analysis, the BCC-O (output-oriented model) is applied, which optimises the outputs. The abbreviation BCC is derived from the initials of its authors who were the first to formulate it: Banker, Charnes and Cooper (1984). This model considers variable returns to scale. It is a radial model comparing the efficiency of several *n*-decision units (Decision Making Units - DMU) in the transformation of *m* inputs of the same type to *s* outputs of the same type (Zhu, 2016). As there can be a large number of units whose efficiency is analysed, it is more suitable to operate with dual models. A more detailed characteristic of the BCC model is rendered by e.g. Banker, Charnes and Cooper (1984), Toloo (2014) or Zhu (2016).

N is the number of units – in our case grammar schools (DMU_j, $j = 1,2, \ldots, n$), where each consumes m different inputs (x_{ij}, $i = 1,2, \ldots, m$) and produces s different outputs (y_{rj}, $r = 1,2, \ldots, s$). The matrix of inputs may be marked as $X = \{x_{ij},\ i = 1,2,\ldots,m;\ j = 1,2,\ldots,n\}$, while the matrix of outputs may be marked as $Y = \{y_{rj},\ r = 1,2,\ldots,s;\ j = 1,2,\ldots,n\}$. The output-oriented BCC model (dual) can be written in the following form (Cooper, Seiford and Zhu, 2011 or Dlouhý, Jablonský and Zýková, 2018: 33).

$$\text{Maximise} \quad \varphi_q + \varepsilon\left(\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+\right) \tag{1}$$

$$\text{Subject to} \quad \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+ = \varphi_q y_{rq} \qquad r = 1,\ldots,s$$

$$\sum_{j=1}^{n} x_{ij}\lambda_j + s_i^- = x_{iq} \qquad i = 1,\ldots,m$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda_j \geq 0 \qquad j = 1,\ldots,n$$

$$s_i^- \geq 0 \qquad i = 1,\ldots,m$$

$$s_r^+ \geq 0 \qquad r = 1,\ldots,s$$

Where x_{ij} are inputs, $i = 1,2, \ldots, m$ is the value of the i-th input for the unit DMU_j, m - number of inputs; y_{rj} are outputs, $r = 1,2, \ldots, s$ is the value of the r-th output for the unit DMU_j, s - numbers of outputs; and where q is evaluated DMU_q, y_q is the output of evaluated DMU_q, x_q is the input of evaluated DMU_q, φ_q – efficiency rate of the evaluated unit (DMU_q).

Depending on the character of returns to scale, a condition has been added in the model. The condition, presuming variable returns to scale, is as follows:

$$\sum_{j=1}^{n} \lambda_j = 1$$

s_r^+, $r = 1,2\ldots,s$, and s_i^-, $i = 1,2\ldots,m$, are dual variables attributed to low constraints for weights of inputs and outputs. In the limiting conditions, these are slack variables for inputs (s^+) and outputs (s^-) and the ε is an infinitesimal constant by means of which the model secures a positive value of all weights of inputs and outputs. Components of vector $\lambda = (\lambda_1, \lambda_2, \ldots, \lambda_n)$, $\lambda_j \geq 0_j$ as weights (coefficients of linear combination) assigned to the respective units of the evaluated set (Cooper, Seiford and Zhu, 2011; Dlouhý, Jablonský and Zýková, 2018).

DEA models provide the users with output information not only regarding the efficiency rate but also about how the evaluated units (grammar schools in the present

research) improve their activities to reach the efficiency frontier (Dlouhý, Jablonský and Zýková, 2018: 35). Some advantages of the DEA approach are: the sources of inefficiency can be analysed and quantified for every evaluated unit; capable of being used with any input-output measurement, although ordinal variables remain tricky (Cooper, Seiford and Zhu, 2011).

By using the DEA SOLVER software for processing the analysis, the final order of efficient grammar schools is obtained along with the answer to the question which schools (grammar schools) are efficient and which are not. Efficient units are on the verge of efficiency while efficiency is equal to 1. The outcome of the DEA analysis is a set of recommendations for inefficient units (in the present study for grammar schools) on how to streamline the production of their educational services.

RESULTS

Representation of the number of grammar schools by types of education provider in regions of the Slovak Republic

According to the European Commission/ EACEA/EURYDICE (2020) grammar schools in the Slovak Republic are established by the state represented by a self-governing region, or a regional or a district authority (61.7%), private entities (16.6%), the church (21.7%). It is therefore a specific combination of public/ private mix of production and financing of education services with a specific focus on grammar schools.

The overview of grammar schools by the type of education provider in regions of the Slovak Republic is seen in Table 3. Years 2012, 2015 and 2019 have been chosen for the sake of comparing the trend of the number of high schools (grammar schools).

Slovakia/ regions**	2012				2015				2019			
	schools*				schools*				schools*			
	Public	Private	Church	Total	Public	Private	Church	Total	Public	Private	Church	Total
Slovakia	152	39	55	245	149	40	57	246	145	39	51	235
BR region	21	13	9	43	21	15	9	45	20	16	9	45
TRN region	16	2	4	22	16	3	3	22	16	3	2	21
TRE region	12	3	4	19	12	3	4	19	11	3	4	18
NI region	17	2	8	27	17	1	8	26	16	0	6	22
ZI region	21	2	6	29	21	2	7	30	21	2	6	29
BB region	20	5	5	30	19	5	5	29	18	6	4	28
PR region	21	6	13	40	21	5	13	39	21	5	12	38
KO region	23	6	6	35	22	6	8	36	22	4	8	34

Note: Number of schools as of September 15th of the respective year, Note:** BR- Bratislava region; TRN- Trnava region; TRE-Trenčín region; NI- Nitra region, ZI-Žilina region, BB- Banská Bystrica region, PR- Prešov region, KO- Košice region.*

Table 3: Number of grammar schools by type of education provider in regions of the Slovak Republic (source: authors according to the Statistical Office of the Slovak Republic, 2021)

Evaluating the number of grammar schools in the Slovak Republic, a noticeable reduction in the number of grammar schools can be seen, namely 235 grammar schools in 2019 compared to 245 in 2012, or 246 in 2015. Comparing the representation of grammar schools in the individual regions of the Slovak Republic, the largest number of grammar schools is found in the Bratislava region (approximately 18%), followed by the Prešov region (approximately 16%), and the third largest number of grammar schools (14%) is located in the Košice region. On the other hand, the lowest number of grammar schools from the regions of the Slovak Republic is represented in the Trenčín region (approximately 8%), with 19 grammar schools in 2012 and 2015, and 18 grammar schools in 2019.

As regards grammar schools by the type of education authority, public grammar schools account for the majority in regions of the Slovak Republic, followed by church grammar schools (with the exception of the Bratislava region). Private grammar schools are the least represented in most regions. The number of grammar schools according to the specific education authorities (public, private, church) differs slightly in the respective regions, especially in the Bratislava region (private grammar schools) and in the Prešov region (church grammar schools).

The results clearly show that, specifically in the Prešov region, out of the total of 38 grammar schools 21 are public grammar schools (55.5%), 5 are private grammar schools (13.2%), and 12 are church grammar schools (31.6%). Using the example of selected grammar schools in the Prešov region, an analysis of the efficiency of secondary education is carried out in the next part of the results.

Evaluation of the efficiency of grammar schools in the conditions of the Slovak Republic using the example of the Prešov region

In this part is presented the efficiency of 26 grammar schools in the Prešov region in the school years 2012-2013 to 2016-2017, using the BCC-O model. The score efficiency in the respective years is seen in Table 4.

Schools	Efficiency score				
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Grammar school JIRASKOVA 12 BJ (Pu)	1	1	1	1	0.8812
Grammar school LIPANY (Pu)	0.9666	0.9724	1	1	1
Grammar school J. A. RAYMAN PO (Pu)	1	1	1	1	1
Grammar school T. VANSOVA SL (Pu)	1	0.9647	1	0.9823	1
Grammar school DR. C. DAXNER VT (Pu)	0.9731	0.9554	1	0.9100	0.9868
Grammar school GIRALTOVCE (Pu)	1	0.9078	0.9952	0.9282	1
Grammar school GEN. L. SVOBODA HE (Pu)	1	1	0.9928	0.9960	0.9527
Grammar school SNINA (Pu)	0.9438	0.9972	0.9789	0.9907	1
Grammar school J. F. RIMAVSKY LE (Pu)	0.957	0.9718	0.9782	0.9161	0.9208
Grammar school P.O. HVIEZDOSLAV KK (Pu)	1	1	0.9773	0.9700	0.9627
Grammar school MEDZILABORCE (Pu)	1	1	0.9753	1	1
Grammar school KUKUCINOVA PP (Pu)	0.883	0.8653	0.9716	0.8466	1
Grammar school SABINOV (Pu)	0.9362	0.8936	0.9195	0.9400	1
Grammar school DUKL. HRDINOV SVIDNIK (Pu)	0.9362	0.9265	0.9636	0.8212	0.9889
Grammar school STROPKOV (Pu)	0.9574	0.9091	0.9507	0.9253	1
Private grammar school BJ (Pr)	0.8511	0.9732	0.9263	0.8500	0.9493
Private grammar school PP (Pr)	0.8617	1	0.9263	0.8900	0.9300
Grammar school - soukroma spojena skola PO (Pr)	0.8511	1	0.8316	0.9800	0.8600
Grammar school SV. MONIKA PO (Ch)	0.9409	0.9689	0.9876	0.9618	0.9083
Evangelical grammar school - EV. SPOJ. SKOLA PO (Ch)	0.8936	0.8386	0.9674	0.7900	0.9878
Grammar school SV. J. ZLATOUSTY HE (Ch)	0.9761	1	0.9368	0.9400	1
Church grammar school SV. MIKULAS SL (Ch)	0.9985	0.9535	0.9368	0.9830	1
Grammar school SV. MIKULAS PO (Ch)	0.8191	0.9263	0.9847	0.8900	0.9501
Grammar school SV. F. Z ASSISI LE (Ch)	1	0.978	0.8931	0.9146	0.9296
Grammar school CIRKEVNA SPOJENA SKOLA HE (Ch)	1	1	0.8842	0.8300	0.9467
Grammar school P.P. GOJDIC PO (Ch)	1	1	0.8842	1	0.9606

Note: Pu – public grammar school, Pr – private grammar school, Ch – church grammar school

Table 4: Efficiency score in grammar schools in the Prešov region in the school years 2012-2013 to 2016-2017 (source: authors by use of DEA SOLVER)

Based on the overall results of success rate over the school years 2012-2013 to 2016-2017, Grammar school J. A. Rayman, having achieved the efficiency score of 1 in all evaluated years, can be considered the best efficiency model. Grammar school Jiraskova 12 in Bardejov and Grammar school Medzilaborce, both efficient four times in the course of the five years, achieved the second best results in efficiency in the evaluated years. Grammar school Lipany, Grammar school P. P. Gojdic and Grammar school T. Vansova in Stara Lubovna achieved three full efficiency scores. On the contrary, six grammar schools were inefficient in all evaluated years. These were two grammar schools established by the self-governing Prešov region, three grammar schools established by the church, and one established by a private entity (see Table 4).

On the whole, mostly grammar schools established by the region and church reached the full score (=1), whereas private grammar schools reached full efficiency only in the school year 2013-2014. In 2012-2013, 10 grammar schools were efficient: seven public and three church. In 2014-2016, only five grammar schools were efficient each year, four of which were public and one church. The highest number of efficient grammar schools, 11, was observed in the school year 2016-2017. The number of efficient grammar schools in the observed period by the type of education provider is seen in Table 5.

Total number of grammar schools by education provider	Efficient grammar schools in the observed school years				
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Public (15)	7	5	5	4	9
Church (8)	3	3	0	1	2
Private (3)	0	2	0	0	0

Table 5: Number of efficient grammar schools in the Prešov region by education provider (source: authors)

Table 6 shows the average efficiency score of grammar schools in the Prešov region. It can be seen that the in the period 2012-2013 to 2016-2017 the average efficiency score of the 26 grammar schools in the Prešov region ranged from 0.91 to 1 in 15 public grammar schools, from 0.90 to 0.92 in three private grammar schools, and from 0.90 to 0.97 in eight church grammar schools.

schools	average score	schools	average score
Grammar school JIRASKOVA 12 BJ (Pu)	0.98	Grammar school DUKL. HRDINOV SVIDNIK (Pu)	0.93
Grammar school LIPANY (Pu)	0.99	Grammar school STROPKOV (Pu)	0.95
Grammar school J. A. RAYMAN PO (Pu)	1	Private grammar school BJ (Pr)	0.91
Grammar school T. VANSOVA SL (Pu)	0.99	Private grammar school PP (Pr)	0.92
Grammar school DR. C. DAXNER VT (Pu)	0.97	Grammar school - soukroma spojena skola PO (Pr)	0.90
Grammar school GIRALTOVCE (Pu)	0.97	Grammar school SV. MONIKA PO (Ch)	0.95
Grammar school GEN. L. SVOBODA HE (Pu)	0.99	Evangelical grammar school - EV. SPOJ. SKOLA PO (Ch)	0.90
Grammar school SNINA (Pu)	0.98	Grammar school SV. J. ZLATOUSTY (Ch)	0.97
Grammar school J. F. RIMAVSKY (Pu)	0.95	Church grammar school SV. MIKULAS SL (Ch)	0.97
Grammar school P.O. HVIEZDOSLAV KK (Pu)	0.98	Grammar school SV. MIKULAS PO (Ch)	0.91
Grammar school MEDZILABORCE (Pu)	0.99	Grammar school SV. F. Z ASSISI LE (Ch)	0.94
Grammar school KUKUCINOVA PP (Pu)	0.91	Grammar school CIRKEVNA SPOJENA SKOLA HE (Ch)	0.93
Grammar school SABINOV (Pu)	0.94	Grammar school P.P. GOJDIC PO (Ch)	0.97

Note: Pu – public grammar school, Pr – private grammar school, Ch – church grammar school

Table 6: Average efficiency score of grammar schools in the Prešov region in the period 2012-2013 to 2016-2017 (source: author's calculations)

Recommendations for inefficient grammar schools in the Prešov region by the type of education provider

Now, recommendations and suggestions are presented for the inefficient grammar schools in the school years 2012-2013 to 2016-2017, using the data presented in the output of the DEA analysis. The absolute values and recommended percentage changes to increase and achieve efficiency are provided for selected inefficient units (inefficient grammar schools). The stated values and percentage changes depend on the selection of input and output factors as well as on the selection of the model and its orientation.

In all five evaluated school years, 2012-2013 to 2016-2017, six grammar schools were inefficient. These are two grammar schools established by a public education provider (*Grammar school in Svidnik and Grammar school J. F. Rimavsky in Levoca*), three church grammar schools (*Grammar school sv. Mikulas, Grammar school sv. Monika in Prešov*, and *Evangelical grammar school - Evanjelicka spojena skola* in Prešov), and one private grammar school (*Private Grammar school Bardejov*). The list of the inefficient grammar schools according to the type of education provider is shown in Tables 7-9.

Recommendations for inefficient public grammar schools

Recommendations based on the BBC-O output-oriented model for the improvement of inefficient public grammar schools in the Prešov region are captured in Table 7.

School year	Grammar school J. F. Rimavsky in Levoca				
	I1	I2	O1	O2	Score E
2012-2013	-15.6	-6.3	4.5	4.5	0.95
2013-2014	0	0	2.9	2.9	0.97
2014-2015	0	0	2.4	2.2	0.97
2015-2016	-9.2	0	11.3	9.2	0.92
2016-2017	-1.8	0	8.6	8.6	0.92
School year	**Grammar school Duklianskych hrdinov in Svidnik**				
	I1	I2	O1	O2	Score E
2012-2013	-8.1	-5.6	10.8	6.8	0.93
2013-2014	0	-1.2	9.4	7.9	0.92
2014-2015	-7.2	0	3.8	4.5	0.96
2015-2016	-30.	0	30.3	21.8	0.82
2016-2017	0	-1.8	1.1	1.1	0.98

Note: input indicator I1 – share of teachers per 100 students; input indicator I2 – contribution to student in EUR; output indicator O1 – rate of graduates admitted to university in %; output indicator O2 – university admission success rate in %

Table 7: Projection of inefficient grammar schools (education provider is a public entity) (source: authors using DEA SOLVER)

If the suggestions for increasing the efficiency of public grammar schools are evaluated according to the BBC-O model (Table 7), a problem occurred in the case of *Grammar school J. F. Rimavsky in Levoca* in the analysed period regarding the number of teachers per 100 students, and in each year an increase in the rate of admitted students (O1) and the percent rate of admission (O2). For the last two years analysed, the required increase ranges from 8 to 11%. To increase and

at the same time approach the patterns of efficiency, it is recommended to offer preparatory courses for universities led by teachers and professors from the required universities, which could increase interest and motivate students to be more interested in preparing for entrance exams. For the first and the last two years analysed, a reduction of the number of teachers per 100 pupils (I1) is advised, caused by the gradual reduction of the total number of pupils and school teachers over the last three years from 199 pupils to 176, and the number of teachers decreased by one each year. This phenomenon may have been caused by the lack of interest on the part of elementary-school leavers and their parents due to prejudices about the quality of church high schools in the Slovak Republic.

Grammar school in Svidnik was inefficient in the analysed period as a result of a high, suboptimal number of teachers per 100 pupils, and also failed to achieve a sufficient percentage of successful admission to universities and the rate of graduates admitted to universities. In 2016-2017, compared to 2015-2016, the grammar school increased the efficiency score from 0.82 to 0.98, because the total number of school students had been reduced from 219 to 197, and also reduced the number of teachers from 24 to 22, and in turn, the number of successfully admitted graduates increased. In the school year 2015-2016, 44 out of 66 graduates were admitted and in the following year 56 out of 63 graduates. To increase efficiency, we recommend to increase (O1) the share of admitted graduates at universities and (O2) the admission rate using preparatory courses which can help graduates in university entrance exams.

Recommendations for inefficient private grammar schools

Suggestions of the output-oriented model (BCC-O) to increase the efficiency of one private grammar school in the Prešov region are listed in Table 8.

School year	Private grammar school Bardejov				
	I1	I2	O1	O2	Score E
2012-2013	-54.0	-17.5	26	17.5	0.85
2013-2014	-14.4	0	12.5	2.8	0.97
2014-2015	-24.6	-0.99	124.4	8.0	0.92
2015-2016	-39.6	-2.0	28.9	17.7	0.85
2016-2017	-21.32	0	5.3	5.3	0.94

Note: input indicator I1 – share of teachers per 100 students; input indicator I2 – contribution to student in EUR; output indicator O1 – rate of graduates admitted to university in %; output indicator O2 – university admission success rate in %

Table 8: Projection of an inefficient grammar school (education provider is a private entity) (source: authors using DEA SOLVER)

In the evaluated years, the *Private grammar school Bardejov* was inefficient. It came closest to the efficiency limit in the school year 2013-2014 with the score of 0.97. Table 8 shows suggestions for input and output corrections for each year. Following the analysis through an output-oriented model, it can be seen that a year-on-year reduction (I1) of the number of teachers per 100 students is recommended. At the same time, an increase of the share of university graduates admitted to universities (O1) and of the percentage of university admission success (O2) is recommended on an annual basis. Based on these findings, it is recommended to reduce the high proportion of teachers per 100 students while it would be suitable to use the services of external teaching staff or increase the attractiveness of the school, e.g. foreign teachers, exchange stays and an increase in the number of pupils at the school and thus increase its efficiency. Once the number of students admitted to the grammar school has increased, the share of teachers per 100 pupils will decrease, and the grammar school will approach the limit of efficiency. The share of students admitted to university can be increased through preparatory courses.

Recommendations for inefficient church grammar schools

Following the output-oriented model (BCC-O), Table 9 provides suggestions for improving the efficiency of three grammar schools, which are established by the church or church community.

Based on the output-oriented BCC-O model, reduction of inputs as well as outputs is recommended for *Grammar school sv. Mikulas*. Regarding outputs, it is recommended to engage in education through clubs, communication and exchange stays with foreign students, to create partner schools and participate in foreign projects and thus increase the chances of admission to universities. The model for the improvement of efficiency also recommends a reduction (I2) in the contribution per student. This phenomenon may be caused by the poorly stated real amount of the contribution or the student contribution comes from several sources. In the case of *Grammar school sv. Monika in Prešov*, to increase efficiency, it is recommended to reduce inputs and increase outputs. According to the analysis of the last year, this grammar school could achieve efficiency if it increases both outputs (O1, O2) by 10%. We suggest participating in projects and getting more points for the admission procedure by engaging and writing e.g. work on professional activities of the school. Based on the model, it is recommended for the *Evangelical grammar school in Prešov* to reduce both input factors (I1, I2), when in 2014-2015 and 2016-2017 the recommended reduction of the student contribution exceeded 40%. The entire contribution from public funds is broken down into the number of students in the school.

School year	Grammar school sv. Mikulas in Prešov				
	I1	I2	O1	O2	Score E
2012-2013	-6	-39.2	29.6	22.1	0.81
2013-2014	0	-41	12.8	8	0.92
2014-2015	-2.4	-36.2	27.5	11.8	0.89
2015-2016	0	-28.8	18.3	12.4	0.89
2016-2017	0	-36.5	5.3	5.3	0.95
School year	**Grammar school sv. Monika in Prešov**				
	I1	I2	O1	O2	Score E
2012-2013	-0.1	-10.9	6.3	6.3	0.94
2013-2014	-0.8	-13.3	3.2	3.2	0.96
2014-2015	0	-3.2	2.2	1.3	0.98
2015-2016	0	0	3.4	4.8	0.96
2016-2017	0	0	10.1	10.1	0.90
School year	**Evangelical grammar school - Evanjelicka spojena skola in Prešov**				
	I1	I2	O1	O2	Score E
2012-2013	-16.8	-27.7	19.5	11.9	0.89
2013-2014	0	-37.4	34.1	19.3	0.83
2014-2015	-20.7	-49.8	3.4	5.6	0.96
2015-2016	-23	-29.8	51.6	26.6	0.79
2016-2017	-8.8	-40.5	1.24	1.24	0.98

Note: input indicator I1 – share of teachers per 100 students; input indicator I2 – contribution to student in EUR; output indicator O1 – rate of graduates admitted to university in %; output indicator O2 – university admission success rate in %

Table 9: Projection of inefficient grammar schools (education provider is a church entity) (source: authors using DEA SOLVER)

DISCUSSION

Public service delivery arrangements, as a mix of the public sector and the private sector reflecting the economic and organisational service conditions, should increase allocation and technical efficiency in the delivery of public services (Afonso, Schuknecht and Tanzi, 2003; Mihaiu, Opreana and Cristescu, 2010; Rao, 2015; Stejskal et al., 2017). The present research addressed the efficiency of secondary education in the regional context of the Slovak Republic, using BCC of an output-orientated model. With respect to the defined goal, the following research question was answered: 'Are efficient grammar schools in the Prešov region related to the particular type of education provider (a public, private, church entity)?'

It can be said that selected grammar schools established any each education provider (a public, private, church entity) reached full efficiency scores in the school years 2012-2013 to 2016-2017 (Table 4 and 5). When comparing score efficiency of grammar schools by the form of education authority in the years 2012-2013 to 2016-2017 (Table 4), score efficiency of public and private grammar schools ranges between 0.82-1. However, when comparing the average score efficiency in school years 2012-2013 to 2016-2017, public grammar schools demonstrate better average results of efficiency, followed by church grammar schools, whereas private grammar schools reach the lowest average score of efficiency (Table 6). Still, the answer to the research question is negative (NO).

At the same time, in terms of the evaluation of efficiency, it must be taken into consideration that the grammar schools by an education authority were not evenly distributed in the analysis, which is also associated with the representation of the individual education authorities regarding high schools in the Slovak Republic.

As regards the results of the present research and the applied method, it is necessary to realise that 'DEA models estimate an efficiency threshold on the basis of a data set with decisive units that must be homogeneous and involve the same activity. DEA models evaluate relative efficiency of the given set of units. By expanding the set by another unit (a grammar school in this particular case) the efficiency may or may not lead to a change to the efficiency frontier estimated by the particular DEA model' (Dlouhý, Jablonský and Zýková (2018: 21). The authors are inclined towards the opinion that in terms of the efficiency score of 0.99 a school can be deemed rather efficient despite not being considered fully efficient unit from the economic standpoint.

As a result, it can be stated that in search of the answer as to why some organisation units are more efficient than others, the right selection of input and output indicators is vital, such as type, teachers, education processes, education policies and educational programmes, which affect the process of schooling and learning (Lockheed and Hanushek, 1994; Haelermans and De Witte, 2012). The main issue is whether the regional education system or local education system fulfil the goals for which they were created and whether schools make the most efficient use of public resources. According to Seiler et al. (2006), one approach is inclined towards the fact that inefficient and ineffective schools are unable to improve their situation on account of a larger amount of public financial resources. Another approach supports the idea that a larger amount of supportive resources (such as the size of classrooms, quality of teachers) improves education.

A more detailed comparison with the present research is relatively difficult, since research dealing with evaluation of efficiency in education focuses on other types of secondary

schools and applies different input and output indicators, or observes different time periods. Research performed in, for instance, the Czech Republic mostly concentrates on the efficiency in secondary schools. Provazníková and Chlebounová (2018) researched efficiency of high schools (using the example of grammar schools and high schools) at the regional level in the Czech Republic. Their results show that, on average, grammar schools use 80% of their capacity, whereas high schools only 60%, while this situation is mainly affected by demographic factors.

Based on research by Chlebounová (2019), performed on the example of Pardubice region in the Czech Republic, it can be stated that grammar schools show significantly better students' results and also lower expenditure on teacher salaries compared to vocational secondary schools. Conversely, marked differences in students' results and expenditure on teacher salaries were confirmed in the case of vocational secondary schools. From the viewpoint of efficiency, grammar schools reach higher similarity between one another compared to secondary vocational schools, which demonstrate stronger differences in efficiency between one another. The same author (Chlebounová, 2019) argues that public secondary schools are mainly funded according to the number of students, and financial resources are allocated centrally. This form of funding renders it impossible for schools to affect the volume of financial resources; however, the numbers of students peak, in spite of the fact that this may lead to worse outputs of these schools.

When comparing the results of the present research of the efficiency of secondary education using the example of grammar schools with similar research on the regional level in the Czech Republic or Slovak Republic, it can be said that the efficiency of the specific secondary schools (grammar schools, business academies, vocational secondary schools) differs significantly. Such research (Provazníková and Chlebounová, 2018; Štrangfeldová et al., 2018 or Mališová and Štrangfeldová, 2020) shows that grammar schools reach higher efficiency in comparison to the other types of secondary schools in secondary education. These differences are associated with factors that affect total efficiency of the evaluated secondary schools. It can be the number of input and output indicators applied, but also various qualitative indicators. It must also be considered that an application of another combination of indicators in the evaluation of efficiency can result in differences in the efficiency of secondary schools.

Based on foreign research dealing with evaluation of efficiency in secondary education (e.g., Coulson, 2009; Crespo-Cebada, Pedraja-Chaparro and Santín, 2013; Masci, De Witte and Agasisti, 2018; Margaritis, Tsamadias and Argyropoulos, 2021) in the regional context it can be stated that public financing with private management can result in greater efficiency. Other author Rao (2015) states that some findings provide evidence about the support of greater efficiency of private schools; others findings confirm that public schools are more efficient. Private schools government-funded must strive to acquire students and to make an efficient use of public finance, unlike public schools. At the same time, private schools must provide a more innovative education service more frequently. By contrast, Silvernail and Johnson (2014) confirmed that public charter schools and traditional public schools differ in their quality. Success of schools depends upon a variety of factors and, therefore, each school should be judged on its output and reached performance.

Also, other research confirms that also other factors come into play in the evaluation of the performance of the individual types of schools (private, public, church), such as competition between schools, innovation features or local and regional conditions (Waldo, 2007; Millimet and Collier, 2008; Haelermans and De Witte, 2012; Holmberg, 2017).

CONCLUSION

In the current theory of public goods, which also encompasses public services, including education, the major question is the selection of a suitable form of the production of public goods – delivery of services. The comparison of the public and private form of the delivery of public services, including education, failed to reach a clear conclusion. Nevertheless, it has opened the question of the evaluation of efficiency reached by the individual producers of public services. Currently, emphasis is placed on a complex evaluation of efficiency of educational organisation in the provision of public services. Most research on efficiency in education, specifically focused on types of schools, focus on particular conditions in the given countries. The aim of the paper was to evaluate the efficiency of services in high-school (secondary) education by various producers in the conditions of the Slovak Republic with a focus on the Prešov region. In this respect, the results bring interesting findings as a national case study and offer possibilities of evaluating various producers of educational services in the form of a replicable methodology.

In school years (2012-2013 to 2016-2017), out of the 26 evaluated grammar schools in the Prešov region, selected grammar schools in each category of education provider (a public, private, church entity) reached a full score. In contrast, in all evaluated years, six grammar schools were inefficient (i.e., two public grammar schools out of 15, three church grammar schools out of eight, and one private grammar school out of three). The results based on the average efficiency score have also shown that public grammar schools demonstrate better efficiency with respect to the form of education provider in comparison to church and private grammar schools. The present research is limited by the applicability of the results, which only concern one form of high schools, i.e. grammar schools, and by the regional context. Future research could provide a more extensive analysis of evaluated schools, including other types of high schools (e.g. selected high schools) represented in the respective regions of the Slovak Republic and could add the evaluation of high-school efficiency in time by use of the Malmquist index, or add the aspect of quality in the evaluation of schools in the public sector.

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Full research paper

EVALUATION OF FINAL EXAMINATION PERFORMANCE AT CZECH UNIVERSITY OF LIFE SCIENCES DURING THE COVID-19 OUTBREAK

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ABSTRACT

The COVID-19 pandemic outbreak has upended the educational system worldwide, possibly with severe long-term consequences as most training institutions were forced to move to an online environment. Given the sudden transition to remote education, the main objective of this contribution is to evaluate the impact of distance education on examination results. We investigated the examination results of tax related subjects collected at the Czech University of Life Sciences in Prague during the period from 2014 to 2020. The sample consists of examination results of 120 different classes within 6 years with a total amount of 7268 observations. Firstly, we pivoted the data into the long format and performed binary logistic regression. Our findings suggest that the odds that student successfully passes the exam increases if the student was examined online compared to in-person. Additionally, we used KNN regression which enables us to predict success rate for an upcoming semester. According to our analysis, it is expected that on average 82 students out of 100 will successfully pass the exam. The model was calibrated using cross-validation to choose optimal K.

KEYWORDS

COVID-19, e-Learning, examination, results, distance education

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Highlights

- *The odds that the student successfully pass the exam increases if the student was examined online compared to in-person.*
- *Out of 100 students enrolled in the subject, 82 is expected to successfully complete the exam.*
- *Distance exam was successfully completed on average by two percentage point higher number of students.*

INTRODUCTION

Since the pandemic outbreak, many transmission and protective measures have been adopted in order to help mitigate COVID-19 spread. Measures preventing social interactions include transition from in-person classes to virtual, affecting all levels of education. Although e-Learning only programs have already been offered in many universities prior to the pandemic, the magnitude in which distant education is used is unprecedented.

As shown in Zhang et al. (2004), effective e-Learning environment may significantly outperform traditional classroom groups. According to Sun et al. (2008: 1196), there are seven decisive factors influencing overall learners' satisfaction with e-Learning, such as learners' computer anxiety, instructor attitude toward e-Learning, e-Learning course flexibility, e-Learning course quality, perceived usefulness, perceived ease of use, and diversity in assessment. However, as pointed by Lu, Le and Vu (2020) and Ho et al. (2021), not all training institutions were prepared for effective e-Learning implementation during the pandemic outbreak. Mudrák, Turčáni and Reichel (2020) created methodology for personalised e-course. Statistical analysis revealed that the use of personalized e-course has a positive impact on students' activity, motivation, and their level of output knowledge. As a result, Eltayeb et al. (2020) conclude that nearly 70% of Prince Sattam University students were dissatisfied with the remote education and only one fifth of students agreed that e-Learning method

helped them understand the scientific materials smoothly and clearly. On the other hand, Aristovnik et al. (2020) performed a comprehensive analysis of the pandemic perception by higher education students on a sample of 30,383 students from 62 countries and the authors mention that the students from Europe have 16.1% higher chances of attaining better overall satisfaction with their university compared to students from other continents.

Although most of the students moved to remote learning, since the COVID-19 patients strained entire healthcare systems worldwide (Weible et al., 2020) and because healthcare workers experienced high rates of infection (Ranney, Griffeth and Jha, 2020), many of the medical students volunteered to the front-line, putting their education on hold. Czech government, for example, imposed obligation of medical students to provide health and social services during the pandemic climax in October 2020. Furthermore, Resnick et al. (2021) discussed the role of public health students in research and practice activities across the US as they have been engaged in contact tracing, monitoring statistics on cases, staffing COVID-19 testing sites and help lines, etc. Given all the disruptions in the current medical educations, the majority of medical students in the UK feel less prepared for beginning work as a doctor (Choi et al., 2020).

It is generally acknowledged that the pandemic outbreak has upended the educational system worldwide, possibly with severe long-term consequences. Education has been one of the most affected due to the administrative imposition of the total closure of educational centres in most of the countries of the world (García Aretio, 2021). The closure of educational institutions has significantly disrupted the day-to-day lives of millions of students, teachers, and researchers. Moreover, with the sudden transition to online learning platforms, the limitations on research projects, as well as lack of standardised policies and procedures, the researchers are concerned about unequal impacts of the crisis (Galloway et al., 2020). Several authors investigated the overall perception of distance learning by the students, e.g., Lu, Le and Vu (2020), Ho et al. (2021), or Eltayeb et al. (2020). Malkawi, Bawaneh and Bawa'aneh (2021) investigated the satisfaction level and attitudes of undergraduate students at United Arab Emirates University towards e-Learning and virtual classes in exceptional circumstances of COVID-19 crisis. The work of Tlili et al. (2020) dealt with the impacts of the applied remote teaching methods of students with disabilities, as well as the faced challenges. Agasisti and Soncin (2020) focus on the impact in the educational sector, by describing an overview of the university's activities and reporting the actions undertaken by university in Milan, Italy. The perception and evaluation of the distance learning model by the students is also related to their ability to use the digital technologies (Peréz-López, Vázquez Atochero and Cambero Rivero, 2021). Noskova, Pavlova and Yakovleva (2021) state that students insufficiently use the digital environment potential of collaboration, knowledge exchange, and knowledge extraction from authentic sources.

Equally important is the perception of distance learning by the teachers. As several researchers point out, there are many problems that teachers face during the remote education. Kruszewska, Nazaruk and Szewczyk (2020) state that the main problems during the distance learning in Poland are insufficient equipment of students with information technologies and little or no communications with students or parents. Scherer et al. (2021) analysed readiness of higher education teachers to online teaching and learning in 58 countries. According to their results, three readiness profiles exist, such as high, low, and inconsistent readiness.

It is expected that sudden transition to remote education may be reflected in the results of university students' exams. Several authors analysed examination results before the pandemic outbreak. Otavová and Sýkorová (2017) evaluated if the way in which students were admitted could predict results in mathematics or students´ performance in general at University of Economics Prague. Klůfa (2015, 2016) studied dependence of the results of entrance examinations in mathematics on test variants at University of Economics Prague. Šánová et al. (2014) evaluated the success rate of students in the Food Goods Knowledge Subject at Faculty of Economics and Management at Czech University of Life Sciences (hereafter denoted as CZU FEM) in relation to the reduction in the amount of teaching hours. The results of the exams in the subject Accounting Theory in 2014-2017 analysed Kuchařová, Pfeiferová and Prášilová (2018). According to research results of Ječmínek et al. (2018), there is no statistically significant difference in the exam results in tax courses between students of various disciplines and forms of study at CZU FEM.

Literature review suggests that the impact of COVID-19 pandemic on university students' exam results has not yet been investigated and hence, the main objective of this contribution is to evaluate the undergraduate performance of final examination throughout the COVID-19 pandemic. We pose following research questions:

1. Is the format of the exam significant factor determining the outcome of the exam?
2. What is expected exam success rate for upcoming semester?

This article is structured as follows. Introduction briefly summarizes literature review as well as the motivation for this paper along with proposed research questions. Section Materials and Methods describes the data we used for the research and our empirical strategy. Our findings are shown in the Results section. Subsequently, we will evaluate the results and show how it relates to other scientific works in the discussion section. Finally, conclusion section is dedicated to summary as well as proposed future continuation of the research.

MATERIALS AND METHODS

The data for this study come from CZU FEM information system and cover time period from 2014 to 2020. We focus solely on tax subjects[1] because the overall difficulty and format of the exam has been steady throughout the years. Our sample

1 Tax System, Tax Theory and Policy, Local Finance and Municipality Management, Tax Administration, Tax System and Administration.

consists of the examination results of 120 different classes, from which 108 were taught in-person. The division of the sample across the years is as follows:

- 2014/2015 – 15 classes – 1185 students,
- 2015/2016 – 22 classes – 1465 students,
- 2016/2017 – 21 classes – 1301 students,
- 2017/2018 – 21 classes – 1154 students,
- 2018/2019 – 20 classes – 1169 students,
- 2019/2020 – 21 classes – 994 students.

In order to answer the first research question defined in previous section, we pivoted the data into the long format, so each observation represents one particular student and respective examination outcome (success/failure). The data now consists of 7268 observations which enables us to perform binary logistic regression. Our model is formally defined as

$$logit(p) = a + b_1 x_1 + b_2 x_2 \quad (1)$$

where p denotes probability that student pass the exam, x_1 is binary explanatory variable that represents the course (either tax course or municipal finance) and x_2 is also binary variable indicating whether it was distance or in-person exam. The method used in fitting the model is iteratively reweighted least squares (IRLS).

Expected exam success rate is estimated with a simple yet powerful machine learning algorithm KNN (*K-Nearest Neighbour*). KNN algorithm is non-parametric method used for both classification and regression. For detailed description of the algorithm see for example Altman (1992). We split the data into training and testing set which enables us to use cross-validation to choose optimal K (number of neighbours considered). We use such K that minimizes RMSPE (Root Mean Square Prediction Error) of the predicted values.

We used R statistical environment for all the calculations along with some additional third-party packages, such as *kknn*, *ResourceSelection* (Hosmer-Lemeshow test), *caret* (model training) and *tidyverse (*data manipulation and visualisation).

RESULTS

As described in previous section, we performed binary logistic regression, which enables us to estimate the relationship between the exam outcome and format of the exam. Figure 1 shows students' performance in respective academic periods. As shown in figure 1, the number of students who successfully completed the exam has remained relatively equal throughout the years. The highest success rate decrease occurred in 2015/2016 which is probably related to the total number of students. Interestingly, the proportion of students who completed the exam on their second attempt has increased in recent years.

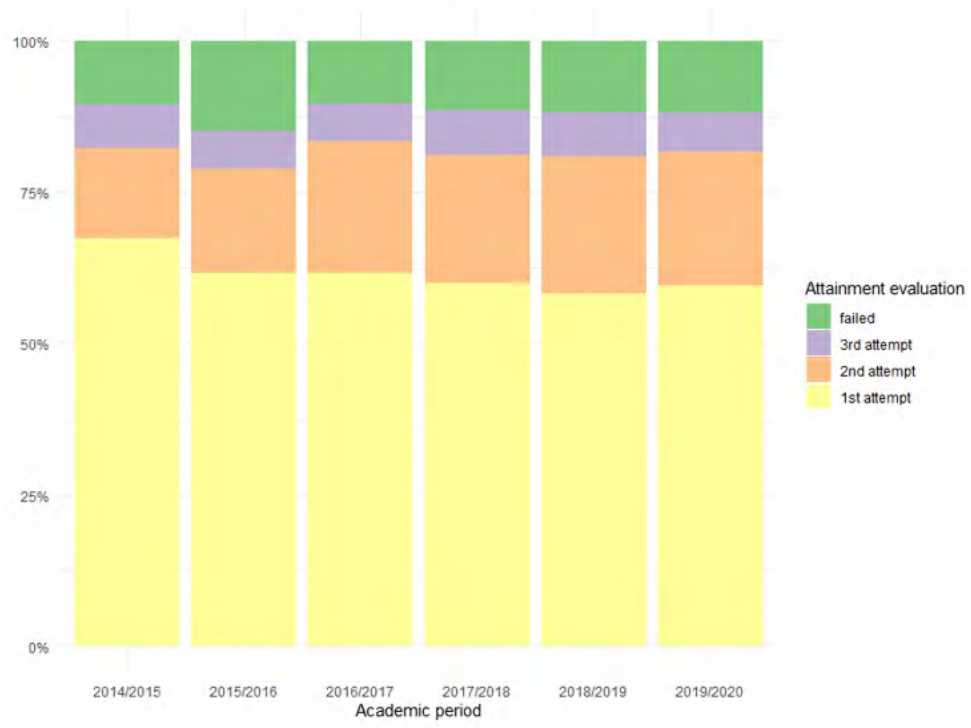

Figure 1: Course evaluation (source: own calculation)

The results of the regression are summarized in Table 1.

Coeff.	Estimate	Std. Error	*z*-value	*p*-value
(Intercept)	1.717	0.041	41.499	<0.001 ***
b_1	0.170	0.072	2.346	0.019 **
b_2	0.232	0.130	1.790	0.074*

Table 1: Model summary (source: own calculation)

As shown in Table 1, *p*-value indicates that both intercept and b_1 parameter are statistically significant at 5% level. The parameters are also all non-negative which shows positive relationship between the dependent variable (exam outcome) and explanatory variables. The model was diagnosed for multicollinearity and for goodness of fit with Hosmer-Lemeshow test[2]. The model shows that the odds that student successfully passes the exam increases by 1.185 times (exponential of the b_1 parameter) if the student studies municipal finances compared to tax course. Similarly, the odds that student passes the exam increases by 1.261 times if the exam was held online compared to in-person.

Second part of our contribution deal with predictions of examination results for upcoming semester. Firstly, we used cross-validation to choose optimal *K*. Our analysis indicates that minimal RMSPE occurs when $K = 7$ with estimated prediction error 7.62 students.

Figure 2 illustrates scatter plot along with regression curve. According to our calculations out of 100 students enrolled in the class 82 students is expected to successfully pass the exam. These calculations are somewhat unexpected as it implies relatively large number of unsuccessful students. However, since the students at CZU are allowed to take the course once again, better data are needed to determine the exact failure rate.

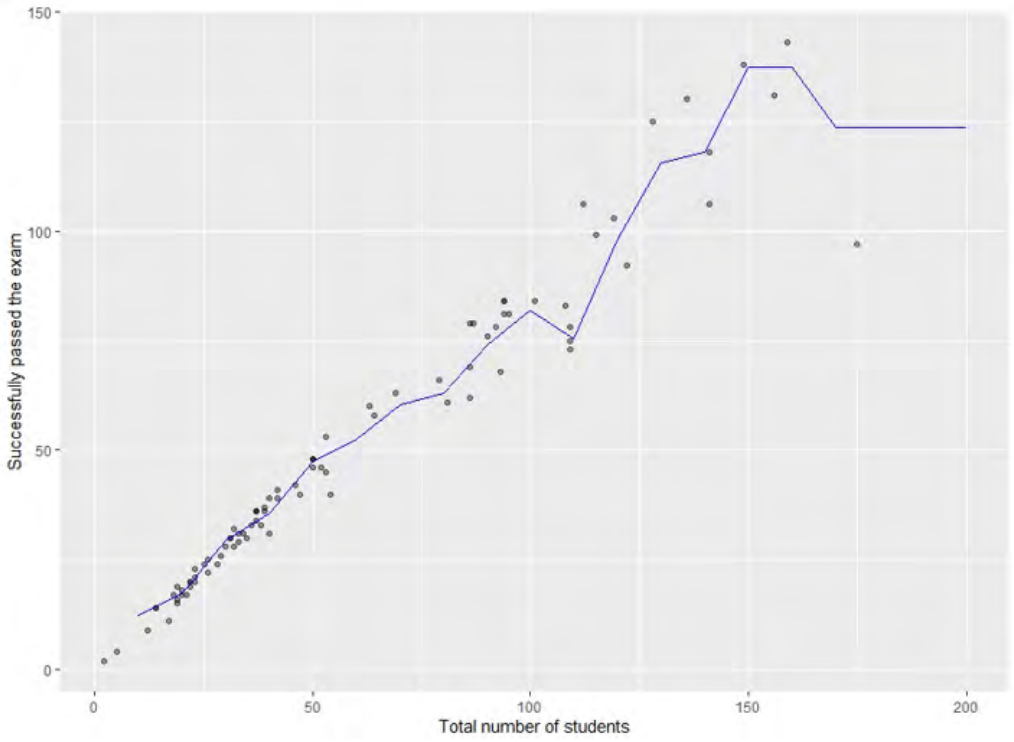

Figure 2: KNN regression plot (source: own calculation)

Although the accuracy of the KNN model decreases around the edges, setting low value of *k* often provides biased predictions as it might lead to the model overfitting. In this case, the model returns most accurate predictions for classes with less than 100 students.

DISCUSSION

Our findings suggest that the odds that student successfully pass the exam increases if the student was examined online compared to in-person. This result is on par with previous studies which found strong evidence that remote classes are more effective than traditional in-person classes (i.e., Zhang et al., 2004; Elfaki, Abdulraheem and Abdulrahim, 2019; Ilgaz and Adanir, 2020).

There are several distinctive features that may enhance effectiveness of remote education. Firstly, E-Learning materials (such as pre-recorded lectures) enable students to study the courses at their own pace (Ruiz, Mintzer and Leipzig, 2006) and if needed, watch the lectures multiple times. Additionally, online classes eliminate the need for commuting, which results in better time flexibility (Lee, Wang and Yu, 2019). On the other hand, administering the exams and ensuring fair conditions without cheating is considerably more difficult in an online environment (Harmon and Lambrinos, 2008) and hence the exam results data be subject to bias. According to Clark et al. (2020), using the same exam in an unproctored online setting as one would for a traditional in-class test does not maintain the same level of academic integrity. Training institutions should, therefore, develop alternative approach, that is more suitable for online environment. The design of such alternative approach depends on overall student assessment process, instructor's capacity, available technology, and various other factors. The design of our online tests was focused more on cheating prevention, rather than on cheating control; we have implemented several protective measures, such as calibrated time setting, multiple-choice format with different variations of the answers, inability to go back to previous questions etc. However, along with suggestions made by Clark et al. (2020),

2 Diagnostics for influential values and linearity is for this specification redundant.

we propose (i) implementing more oral exams which reduces the risk of academic dishonesty but are more demanding on time consumption and are not universally applicable for all classes and (ii) incorporate creative assignments to encourage students to think critically, develop necessary writing skills and possibly teach students to work cooperatively. Such creative assignments could be anything from a simple presentation to a coding project, case study or some real-world tasks. These practical assignments are especially useful for tax subjects, because students can fill out various tax returns, explore corporate and municipal finances and potentially solve international tax problems. Additionally, during the pandemic times examiners can use some of the available communication platforms to schedule oral exams and leverage the built-in tools such as screen sharing, document collaboration, and further discuss the assignment. Nonetheless, given the sudden transition to remote education, it is expected that training institutions will continuously improve its e-Learning system and achieve more effective online environment.

The second part of our research dealt with examination results analysis using KNN algorithm. According to our calculations, out of 100 students, 82 is expected to successfully complete the exam. We calibrated the model using cross-validation to choose optimal level of neighbours considered. This model is particularly useful for prediction as well as for monitoring expected examination success rate. Our study, however, does have some limitations; (i) the data we worked with does not include other important attributes such as gender or the age of the students which restricts the number of regressors we are able to include into the model, (ii) our study covers a limited number of taught subjects and, therefore, we cannot generalize the results for the whole faculty or university. Future research should, consider broader array of subjects and potentially gather more rich data.

CONCLUSION

Distance learning has been steadily increasing in popularity for the past two decades. Although many researchers argue that distance learning model does not perform all the functions that traditional in-person teaching does, remote education played major role preventing COVID-19 spread. In this paper, we emphasized the questions regarding the differences in CZU FEM examination results before and during the pandemic outbreak using binary logistic regression. Our findings suggest that the odds that student successfully pass the exam increases if the student was examined online compared to in-person.

Additionally, we performed KNN regression that enables us to predict exam success rate for the upcoming semesters. The estimated model implicates that expected exam success rate is on par with previous research papers that estimated average exam success rate at Czech University of Life Sciences Prague. In our future research we would like to focus on faculty wide examination results.

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Full research paper

ATTITUDES OF EMPLOYERS AND UNIVERSITY STUDENTS TO THE REQUIREMENTS FOR ACCOUNTANTS IN THE CZECH REPUBLIC

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ABSTRACT

The aim of the study is to verify employers and university students' perception of the importance of professional and soft competencies that is placed on the position of financial accountant in the Czech Republic. The study is based on the international knowledge oriented to the difference between university students and employers in perception of the importance of professional and soft competencies. The research is focused on Czech companies from two regions and students of Accounting and Finance attending universities from two different regions. The research was conducted with the help of advertisement analysis and a questionnaire survey in the first quarter of 2020. In the advertisements, mainly the information literacy and usage of English language in accounting appeared. The perception of employers is not in accordance with the importance of competencies perceived by students who would like to work in the accounting profession. Responsibility, reliability, accuracy, and independence are important for students. Differences in the perception of competencies importance were not found. This study contributes to the identification of the competency's importance regarding employers and students. It will be necessary to innovate teaching methods with the emphasis on the effective readiness of graduates for the accounting profession.

KEYWORDS

Accountants, employers, professional competence, soft skills, students

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Highlights

- *For the Czech companies, professional competencies for the performance of the accounting profession are more important than soft competencies.*
- *For university students, soft competencies are more important than professional competencies.*
- *There are no differences in the perception of the importance of competencies with respect to students' gender and type of university.*
- *Information literacy and skills regarding English language in accounting are the most required competencies.*

INTRODUCTION

The preparation of university students for economic profession is developing in a dynamic way. Development is visible in innovative forms, methods and digital technologies that enable the adequate development of competencies that are most required by employers (Rudenkol et al., 2018). The development of economic practice has been significant. At the same time, the requirements of the labour market are constantly changing. Above all, higher demands of society are visible in this trend. Universities are reacting to the current trend with the help of practical training of their students (Moore and Morton, 2017). There are studies based on examining the opinions of university students regarding required competencies of employers and evaluating their importance (Kirstein, Coetzee and Schmulian, 2019). This view offers universities another possibility to bring innovative approaches and prepare students for employment and success in the labour market. Employers require not only professional, but also soft competencies

of their employees and job seekers. Many studies (e.g., Lim et al., 2016; Pereira, Vilas-Boas and Rebelo, 2019; Tan and Laswad, 2019) examine the relationships connected to these requirements in different economic professions and in different working positions. However, it is still not clear which competencies (professional or soft) are more important for employers in relation to economic working positions. There appear different research results, which is caused by differences in methodological approach, the methods used, working positions choice, the behaviour of the respondents of the research or also by the research period.

The aim of the empirical study does have two basic lines, which are based on following initial question: *What are the requirements of Czech companies on the position of accountant according to the perception of employers and university students of accounting and finance?* Both employers and students evaluate the importance of competencies required from the accountants. For the accounting profession is differentiated into various positions with distinct content and responsibility, this study focuses on the position of financial accountant. The research is focused on two sample groups - a) *companies (employers)* based in the capital city of Prague and in the Vysočina Region, b) *students of the bachelor's program* of the Prague University of Economics and Business and the College of Polytechnics Jihlava in the Vysočina Region who study Accounting or Finance. Students of these fields were selected for research mainly with regard to the higher probability of their interest in the accounting profession.

This research follows a study that dealt with the preparation of students for future economic professions in terms of innovation in education (Berková, Krpálek and Krpálková Krelová, 2019). The authors verified the importance of practical training of future professional accountants, auditors, and entrepreneurs during their studies from the perspective of multinational companies in the category of the Czech Republic's Most Attractive Employers and from the perspective of students at the Prague University of Economics and Business in Accounting and Financial Management in the Czech Republic. These students very often get positions in above mentioned companies. The authors found out the emphasis of practice on business and market knowledge in relation to these professions in the international context. Our new research aims to explore the area of requirements of small and medium-sized companies with a greater focus on the national level. The survey is based on the analysis of advertisements from relevant sources. This shows the main difference between a new study and the authors' research (Berková, Krpálek and Krpálková Krelová, 2019). There is also another difference, because the new study expands the range of researched competencies, deals with students from two Czech universities and seeks a dependence of students' perceptions regarding the importance of competencies for the accounting profession with respect to their gender and type of university.

Methodologically, our research is based on an empirical study resulting from the idea that there is a difference between recent university graduates and employers in perceiving the importance of professional and soft competencies required from employees (Manzoor et al., 2018). Although this study concerns the field of Engineering, its methodological elaboration is transferable to other fields. At the same time, the research reflects a methodological approach in relation to examining the requirements of employers for accounting professions (Tan and Laswad, 2019) and findings from a study (Rudenkol et al., 2018), which deal with innovative requirements for the training of undergraduates, the process of forming professional competencies in the educational space of the university based on new methods and digital teaching aids. The article is divided into five main parts. In the introduction and the Theoretical Background, the authors present the general aim of this study and, with the help of existing knowledge, present the importance of the research plan and the creation of individual hypotheses. The following sections are connected with the research methodology, the presentation of the results, including their interpretation. In the Discussion section, the authors discuss the results with respect to knowledge in other studies and explain the limits of the research. The conclusion contains the theoretical and practical implications of the study.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The concept of competence is defined by several authors. In particular, they agree that competencies are acquired attitudes, knowledge, and skills of the individual, which are necessary for working performance and which are monitored on the level of professional or also technical and soft competencies (European Commission, 2008; Spencer and Spencer, 2008). It is proved empirically that higher level of competencies - not only for their productivity, but also for their relative rarity - leads to the better position in the labour market. The effect is visible the most in higher chance of getting a job, lower risk of dismissal and a higher wage (Orazem and Vodopivec, 1997). The importance of both groups of competencies has evolved differently and is still evolving. Between 1970 and 2002, there was a significant increase of the number of people in positions with essential soft competencies (Borghans, Weel and Weinberg, 2006). Soft competencies also have a positive contribution regarding possible doubling employees' wages about the specific working positions. It is possible to assume that soft competencies are for employers more crucial than professional competencies. This thesis (Borghans, Weel and Weinberg, 2006) has been developed in further research in order to demonstrate relationships, often with different results. Nevertheless, the studies have led to the common conclusions - employers require soft competencies to be developed. Their attention is paid especially to problem solving, decision making, communicative and interpersonal competencies (Manzoor et al., 2018). The observations presented byManzoor et al. (2018) are consistent with recent research published by Tan and Laswad (2019) focusing on accounting positions in Australia and New Zealand. The authors concluded that the skills of accountants are more limited in the personal and interpersonal areas that are important for employers. Other research has shown that readiness to learn, influence, and planning are important for employers (Fernandez and Liu, 2019). Above all, it depends on the specific working position

that relates to the importance assessment of professional and soft competencies. Based on these findings, hypothesis 1 is created: There is difference in requirements of employers for the performance of the accounting profession in professional and soft competencies. The hypothesis is the subject of this study.

The accounting profession is becoming more and more demanding because of companies aim to meet the demanding society needs. Modern professional accountants need both hard and soft skills. Regarding hard competencies, in business practice, the emphasis is also placed on the International Financial Reporting Standards (IFRS). This issue is becoming very crucial for meeting society needs (Vallišová and Dvořáková, 2018). The development is also visible in modern scientific disciplines, such as environmental accounting (Vallišová, Černá and Hinke, 2018). It means that education systems will have to be constantly innovated to meet this demand (Aris et al., 2013). Different research focused on employers' requirements for accounting positions evaluate professional and soft competencies differently. Asonitou and Hassall (2019) examined the training of undergraduates in the accounting profession. They identified problems in students' professional readiness as well as problems in accounting education, which is not in accordance with global economic trends. Above all, it is a necessary to develop critical thinking, which leads to the change of the curriculum and teaching strategies to promote employability and sustainable development (Berková, Borůvková and Lízalová, 2018). Similar research has also been conducted on the level of soft competencies. In the international context, the problem was identified in connection with required skills of accountants. Especially it appeared in the field of interpersonal and communication skills (Mameche, Omri and Hassine, 2020). Some weaknesses in communication skills were also demonstrated by Webb and Chaffer (2016). There are gaps in expertise and language literacy, specifically lower skills in English language usage (Lim et al., 2016). Webb and Chaffer (2016) demonstrated that university teachers are highly focused on the professional side of practical training and their closer attention is not paid to the development of soft competencies. Research also proved that employers appraise mostly communication skills, analytical skills, and time management. They prefer positive approach to the employment. It means that soft competencies are becoming more and more important. This knowledge has influenced the teaching of accounting at various universities as well as the International Federation of Accountants (IFAC) members (Mameche, Omri and Hassine, 2020) and is confirmed by the research of Chaffer and Webb (2017), who focused on the evaluation of the required competencies of British university graduates in accounting and on the quality of training in professional accounting *Certified Institute of Management Accounting*. According to the authors, weaker level of skills should not be explained with the poor preparation during the university studies. Universities must respond to these limitations and constantly innovate education systems to increase the quality of students' training (Moore and Morton, 2017). The effective steps include mainly the reactions regarding research results in the form of subject innovations, extra-semester courses focused on competencies required by employers (Roberts et al., 2020), as well as the inclusion of modern technologies in the curriculum (Brownstein, Murad and Hunt, 2015).

The important factor is also perception of university students regarding the importance of competencies for the accounting positions. It is necessary to focus on possible conflict or agreement related to the perception of students and employers. This dependence is essential for preparation for the practice, because students' ideas about their dream job have the impact on their further development. This topic was discussed in several studies that assessed – from the students' perspective - the importance of competencies requiring by employers (Kirstein, Coetzee and Schmulian, 2019). We can find also researches that measured students' level of competencies in relevant subjects in relation to their readiness for practice (Manzoor et al., 2018). In 2018, the authors found that there are significant differences between the perceptions of employers and students regarding the importance of competencies for the profession (Manzoor et al., 2018). Students' awareness of the profession requirements is low. For this reason, we are interested in possible dependence between students' perceptions of the importance of professional and soft competencies. This aspect is connected with hypothesis 2, which is the subject of this study. Skills that employers consider to be important are not so important for students. These skills are mainly creativity, communication, interpersonal skills, decision-making, and problem solving. Students place more emphasis on qualification (Manzoor et al., 2018).

In terms of self-regulatory learning, there are gender differences. Women's self-regulatory abilities are more significant in comparison with men's ones. This fact is valid not only for motivational aspects, but also for learning strategies (Lebid and Shevchenko, 2020). Women students also spend more time with the study and report better study results than men students (Larruzea-Urkixo and Cardeño Ramírez, 2020). Other studies have shown that women have significantly higher risk aversion than men. At the same time, soft skills are negatively associated with risk-taking (Andreoni et al., 2020). For this reason, we focus on the perception of the importance of soft and professional competencies from the students' perspective regarding their gender. Additionally, the factor university as a place of study was added. This factor can affect the perception of the importance of both groups of competencies for the performance of the accounting profession. This is connected with hypotheses 3 and 4, which are the subject of the research: Students' perception of the importance of professional competencies depends on their gender and their university. Students' perception of the importance of soft competencies depends on their gender and their university.

MATERIALS AND METHODS

Research sample

Two groups of respondents were selected for the sample. The first sample consists of Czech companies based in the capital city of Prague and in the Vysočina Region. In this sample, there were companies publishing their requirements in advertisements on serious job portals in the real-time of

research (February to March 2020). The job portals were following: Jobs.cz; PROFESIA.cz; Práce.cz; Správnýkrok.cz; Pracomat.cz; upcr.cz; Dobra prace.cz. On the whole, the total number of 44 relevant companies were analysed (22 companies from the capital city of Prague and 22 companies from the Vysočina Region). For the Vysočina Region, all the job offers were published on these job portals in real-time surveys. The number of advertised job positions in Prague was significantly higher at the time of the investigation compared to the Vysočina Region, but in order to maintain consistency in the number of advertisements, the same number of offers was selected. The main aspect for the selection of companies in Prague was the monitored 15 competencies, which are the subject of the survey. According to their highest occurrence in advertisements, companies based in Prague were selected. In Table 1, there is a list of companies that required professional and soft competencies in their advertisements.

These companies published their requirements for the position of financial accountant (Table 1).

Vysočina Region	Capital city of Prague
Consulta HR s.r.o.	NEXT REALITY GROUP a.s.
RIMOWA CZ spol. s r.o.	Hagen Human Capital s.r.o.
IP IZOLACE POLNÁ, s.r.o.	MAKO-daně s.r.o.
MANN + HUMMEL (CZ) v.o.s.	RSJ Custody s.r.o.
GORDIC spol. s r.o.	Manuvia Expert Recruitment
Lenka Havlíková	Menzies Aviation (Czech), s.r.o.
ICOM transport a.s.	JOB LEADER CZECH s.r.o.
VALEO ČESKÁ REPUBLIKA	PRODIMO ACCOUNTING s.r.o.
O.K. AUTOMOT, s.r.o.	ADVANCE HR,s.r.o.
Crystal BOHEMIA, a.s.	Kingscourt Express, spol. s r.o.
EKOSTAVBY JABŮREK s.r.o.	Hays Czech Republic, s.r.o.
VRTAL, s.r.o.	Grafton Recruitment s.r.o.
Kateřina Mičková	ISS Facility Services s.r.o.
MOTORPAL, a.s.	Lidové bytové družstvo Praha 3
Holoubek trade s. r. o.	GTH catering a.s.
KRONOSPAN CR,spol. s r.o.	Servisní středisko pro správu svěřeného majetku Městské části Praha 8, příspěvková organizace
FUDAPEM, s.r.o.	ENGIE Services a.s.
LEPŠÍ PRÁCE s.r.o.	Univerzita Karlova, Filozofická fakulta
Grafton Recruitment s.r.o.	ProfesKontakt, s.r.o.
Agro MONET, a.s.	Domácí hospic Cesta domů
Jobs Contact Consulting, s.r.o.	EFIT Bohemia, a.s.
Advantage Consulting, s.r.o.	Barceló Hotel Group

Table 1: Analysed companies, 2020 (Source: Authors)

In terms of size, the companies are small and medium. The size of the company is not crucial for this research. The factor that is crucial for the purpose of this analysis is the region in which the company is based. For this reason, the study is not focused on the size of the company. Regarding the subject of activity, these companies are active in production or services. However, there are the aggregate numbers of small and medium-sized companies for individual regions and activities. In the Vysočina Region, 11 small and 3 medium-sized companies providing services and 4 small and 6 medium-sized companies operating in production were analysed. In Prague, 16 small and 5 medium-sized companies providing services and 1 medium-sized company operating in production were analysed. Some companies are oriented both on providing services and production, and therefore they are included in these numbers according to their activity. The companies were included in the sample by deliberate selection according to the region. Prague was chosen not only for its status of the capital city, but also for the reason that this region offers great job opportunities and the possibility to start the accounting career successfully. The Vysočina Region was chosen due to lower job opportunities in the accounting profession. Different regions were selected to balance the sample. Among regions, there were not tested any differences due to lower sample. That is the reason of future hypothesis application with extended employer sample.

The second sample consists of students of the Accounting and Finance bachelor's study fields from the Prague University of Economics and Business and the College of Polytechnics Jihlava. The selection of these universities was determined by the selection of analysed regions. Another reason is the fact that these universities are the largest ones in the regions to provide economic education in the field of Accounting and Finance. At the same time, the choice of these two universities was supported by the fact that after graduation, students often stay in the city of their studies or move to the capital city to build their professional career. Therefore, the selection of these universities is relevant, and the results provide credible findings. It is also possible to compare the requirements of employers for accountants with the attitudes of students studying relevant fields and having assumption to continue in these fields in their further career directly in the selected cities. Universities were included in the research by deliberate selection, as well

as 74 students who participated in the research in the period from February to March 2020. The total sample consists of 34 students (46%) from the field of Accounting studying at the Prague University of Economics and Business and 40 students (54%) from the field Finance and Management from College of Polytechnics Jihlava. The students of the third year of full-time bachelor's study at both universities were addressed. There were 45 addressed students from the College of Polytechnics Jihlava. The return was on the level of 88.8%. 70 students at the Prague University of Economics and Business were contacted and the return reached 57.1%. The sample consisted of 48 women and 26 men. The Prague University of Economics and Business involved the sample of 16 men and 18 women. At the College of Polytechnics Jihlava, there were 10 men and 30 women. The research was carried out as an optional one. The sample is not larger because in the Czech Republic, the declaration of emergency due to COVID-19 was stated and there was the ban for students to be present at universities. The sample was not differentiated by age, as this factor is not consistent with the aims of this study.

Data collection methods

For data collection, qualitative and quantitative research was used. Qualitative research was carried out by analysing official documents obtained from company advertisements and was inspired by international research based on the same method (Tan and Laswad, 2019). The analysis is further focused on the requirements of employers for the position of financial accountants, regardless the size of the company. These monitored professional and soft competencies were divided in detail and for each competence there was expressed the frequency of its total occurrence in advertisements of 44 companies. Quantitative research was based on the method of questionnaire with the help of non-standardized questionnaire. The research was methodologically inspired by an international study (Manzoor et al., 2018). Interviewing was realized directly at universities and the students were physically present. Before the actual research, preliminary research was carried out. In preliminary research, there took part the sample with the same characteristics of the respondents as in the main research. 10 students participated in the pilot survey This fact increased the validity of research content and reliability of research tool. The questionnaire contained a combination of closed questions with open-ended questions. Using open questions, factual data of respondents (students) were determined, i.e., gender, university, field of study, year, and the form of study. There were used mostly five-level Likert scales. Furthermore, in the student-oriented research, the numerical values expressing the importance of soft competencies were assigned to them. The following professional competencies were present in the model: information literacy, language literacy, invoicing, final accounting activities (closing accounts), reporting, audit preparation, tax processing, wage processing. Furthermore, these were the following soft competencies: independence, accuracy, reliability, responsibility, cooperation, effective communication, flexibility. Overall, 15 competencies relevant to the financial accountant position were analysed. They were selected with respect to their appearance in the advertisements published. The students assigned to the above mentioned professional and soft competencies in the questionnaire the importance, which was expressed by numerical values from 1 to 5, while 1 expressed insignificance and a value of 5 meant the highest degree of importance of competence for the accounting profession performance.

Methods of statistical analysis

A correlation matrix was constructed to determine the correlation relations between variables in the case of testing hypotheses 1 and 2. With respect to ordinal variables, Pearson's correlation coefficient *r*, which is usually used for this type of data, was used. The data contain mostly numerical ordinal variables. Both types are commonly treated as numerical variables (Cohen, 1988). A paired Student's *t*-test was used to verify Hypothesis 1, with respect to comparison of companies' requirements for professional and soft competencies of accountants. Statistical analysis was performed using the program SPSS.

Data from student-oriented questionnaire were obtained with the help of a scale of 1-5, where students assessed the importance of competence for their profession performance. The results show that the higher the value, the higher the importance of competence. The total score for each separated competency group, expressing the importance of professional and soft competencies, was determined using the average of the obtained data. The test examined the differences in the perception of the importance of professional and soft competencies from the perspective of all students, and, also, from the university and gender perspective. Differences connected with gender and university factors were monitored separately for each group of competencies (professional and soft). Due to the ordinal nature of the data, a nonparametric Man-Whitney *U*-test (hypotheses 3 and 4) was used to test the dependence of the perception of the importance of each competency group on gender and university, as no normal distribution was proved. For this purpose, null hypotheses were defined. Null hypotheses are formulated as follows:

- $H_{0\text{-}1}$: *There is no difference in requirements of employers for the performance of the accounting profession in the area of professional and soft competencies.*
- $H_{0\text{-}2}$: *There is no relation between students' perception of the importance of professional and soft competencies.*
- $H_{0\text{-}3}$: *Students' perception of the importance of professional and soft competencies does not depend on their gender and their university.*
- $H_{0\text{-}4}$: *Students' perception of the importance of professional and soft competencies does not depend on their gender and their university.*

RESULTS

The results regarding the verification of hypothesis 1 show that employers (n = 44) do not perceive the importance of professional and soft competencies in the same way. A paired *t*-test was used to determine the difference between preferences, and the relation between the importance of professional and soft competencies for the employers in the accounting profession was also found. The results of paired *t*-test and non-parametric test led to the same findings. Therefore, the

results of the Student's *t*-test are published. It was found that the requirements of employers differ significantly in the area of professional and soft competencies ($p < 0.001$). Table 2 shows the results of the descriptive statistics in connection with the paired Student's *t*-test. At 5% of the significance level, we reject hypothesis H_{0-1}.

Variable	N	Mean	Standard Deviation
Professional competencies	44	2.89	3.35
Soft competencies	44	2.09	2.58

Table 2: Descriptive statistics, 2020 (Source: Authors' Calculation)

Using Pearson's correlation coefficient *r*, a direct dependence of employers' requirements for professional and soft competencies of accountants was found at 5% of the significance level ($p < 0.001$; $r = 0.963$).

It was proved that the Czech employers (from 44 selected companies) appreciate the professional competencies. Differences between regions were not examined due to a lower sample of companies from the Vysočina Region. Therefore, the frequencies of occurrence of the required competencies for both regions were determined separately, just with respect to the professional and soft competencies. Soft competencies appeared in the advertisements of Prague companies in the total number of 48 times, while in the advertisements of companies from the Vysočina Region they were identified 44 times. The results are almost balanced. A similar situation occured in relation to required professional competencies. Professional competencies (listed in Table 3) appeared in advertisements 64 times regarding companies from Prague and 63 times regarding the Vysočina Region. Table 3 shows the summary of results that indicate the number of required individual competencies in the advertisements of the Czech companies.

Competence	Group of competencies	Absolute frequency	Proportion of occurrence in the total number (%)
Information literacy	Professional	26	59.1
Linguistic literacy (English language usage)	Professional	20	45.5
Invoicing	Professional	16	36.4
Final accounting activities (closing accounts)	Professional	16	36.4
Reporting	Professional	11	25.0
Audit preparation	Professional	13	29.5
Taxes	Professional	15	34.1
Wages	Professional	10	22.7
Independence	Soft	23	52.3
Accuracy	Soft	19	43.2
Reliability	Soft	16	36.4
Responsibility	Soft	13	29.5
Cooperation	Soft	6	13.6
Effective communication	Soft	8	18.2
Flexibility	Soft	7	15.9

Table 3: Occurrence of competencies in advertisements of Czech companies, 2020 (Source: Authors' Calculation)

It means how many times the specific competence occurred in the advertising. The average share of the occurrence in relation to the total number of companies is 36.1% regarding professional competencies and 29.9% regarding soft competencies. The employers require on financial accountants mostly information literacy (59.1%). For this study, information literacy is connected with work in MS Office and in accounting programs. Independence (52.3% of representation) and English language use (45.5%) are becoming important. This fact is also related to the character of accounting profession that requires high level of commitment, responsibility, and dealing with contracts on the level of international accounting. Almost at the same level of significance as English language use is accuracy (43.2%) that is necessary for the accounting profession due to work with legislative regulations, laws, contracts, etc. Other competencies occurred in the representation of one-third or less. The least important competence of financial accountants from the point of view of Czech employers is cooperation.

The results of the hypothesis 2 verification show that students at the Prague University of Economics and Business and the College of Polytechnics Jihlava in the Vysočina Region studying the last year of the bachelor's degree programme in Accounting and Finance ($n = 74$) do not perceive the importance of professional and soft competencies at the same level (similarly to employers). Using Pearson's correlation coefficient *r*, no similarities in the assessment of the importance of soft and professional competencies for accounting profession ($p = 0.246$) were found at 5% of the significance level. Pearson's correlation coefficient is $r = -0.137$.

At 5% of the significance level, we do not reject null hypothesis H_{0-2}. It has been proven that university students from the fields of Accounting and Finance ($n = 74$) prefer soft competencies. The average evaluation of soft competencies for all participating students is 4.30. Table 4 shows the position of indicators in the evaluation of students regarding professional and soft skills, which the students perceive as more important for the implementation of the accounting profession.

Group	Mean	Median	Variance	Standard Deviation
Reliability	4.69	5	0.27	0.52
Responsibility	4.69	5	0.32	0.57
Accuracy	4.62	5	0.37	0.61
Independence	4.35	5	0.61	0.78
Effective communication	4.05	4	0.86	0.93
Cooperation	3.96	4	0.69	0.83
Flexibility	3.74	4	0.84	0.92
Professional skills	2.64	3	0.47	0.69

Table 4: Students' perception of the importance of professional and soft skills, 2020 (Source: Authors' Calculation)

Students perceive reliability, responsibility, accuracy, and independence as the most important soft competencies. For these three competencies, the common aspect is the employees' cooperation, which is perceived by students as less important for the performance of the accounting profession in the position of financial accountant.

Mann-Whitney *U*-test was used for findings of gender differences in the perception of the importance of soft and professional competencies, as well as for differences connected with type of university or university location (hypotheses 3 and 4). The results regarding differences between women and men connected with their soft and professional competencies stated at the significance level of 5% are shown in Tables 5 and 6.

Group	Men (n = 26)	Women (n = 48)	Different (p)
Professional competencies			
Mean	2.50	2.71	
Median	2.50	3.00	0.288
Variance	0.56	0.42	
Standard Deviation	0.76	0.66	
Soft competencies			
Mean	4.17	4.37	
Median	4.00	5.00	0.287
Variance	0.32	0.23	
Standard Deviation	0.57	0.48	

Table 5: Gender differences in the perception of the importance of soft and professional competencies, 2020 (source: Authors' Calculation)

Group	Students-Prague (n = 34)	Students-Vysočina (n = 40)	Different (p)
Professional competencies			
Mean	2.53	2.73	
Median	3.00	3.00	0.323
Variance	0.48	0.45	
Standard Deviation	0.70	0.67	
Soft competencies			
Mean	4.34	4.27	
Median	5.00	5.00	0.322
Variance	0.28	0.26	
Standard Deviation	0.53	0.51	

Table 6: The importance of soft and professional competencies from the university perspective, 2020 (source: Authors' Calculation)

The dependence of students' perception of the importance of professional and soft competencies on gender and university has not been proven. Therefore, we do not reject null hypotheses $H_{0\text{-}3}$ and $H_{0\text{-}4}$ at the significance level of 5%. Women and men perceive soft and professional competencies in the examined sample the same regarding their importance. The same importance is given to both groups of competencies regarding the university. With respect to average values, there are factual differences in the perception of the importance of professional and soft competencies for the performance of the future profession (Table 5, 6). Women place more emphasis on professional and soft competencies than men. Professional competencies for the accounting profession are perceived as more important according to the students at the College of Polytechnics Jihlava compared to students at the Prague University of Economics and Business. Regarding soft competencies, there is the opposite result. With respect to average values, students at the Prague University of Economics and Business perceive higher importance of these competencies.

DISCUSSION

The research conducted among Czech employers and university students focused on their perception of professional and soft competencies importance in the field of financial accounting profession has shown interesting results. There are differences

between these two groups in the perception of professional and soft competencies importance in the field of accounting profession. Employers whose representatives were small and medium-sized Czech companies and organizations (n = 44) from the Vysočina Region and the capital city of Prague consider professional competencies as significant. In contrast, students at researched universities in the field of Accounting and Finance consider development of soft competencies as significant.

However, this result is inconsistent with several studies that have shown the opposite. For example, the Australian and New Zealand employers require interpersonal skills primarily (Tan and Laswad, 2019). Readiness to learn, influence and planning (Fernandez and Liu, 2019) are also important. The conflict in the assessment of the importance of professional and soft competencies can be caused by other cultures, but also by the size of companies. In these studies, just nationalities were known (without other factors describing the research subjects). Other research (Mameche, Omri and Hassine, 2020; Webb and Chaffer, 2016) has contributed to the significant finding that companies require communication skills in the accounting professions (that are at the lower level). The Czech companies almost do not require this ability. The occurrence of these skills in advertisements was at a low level.

What employers require from the accounting profession the most is information literacy (i.e., working with MS Office and accounting programs), independence and using of English language with special focus on accounting issues. At the same time, the validity of this statement can be extended to the international context regarding the study (Lim et al., 2016) with the identical conclusions. In the accounting profession, the importance of English language is related to the development trends in economy. The emphasis is placed on IFRS; this issue is crucial today for meeting the society needs (Vallišová and Dvořáková, 2018). It is necessary to mention that the professional competencies and knowledge that are closely related to accounting appeared in advertisements just sporadically in comparison with the information and language literacy. This result can be explained by the fact that for the Czech companies, general skills workable in other positions are more important. At the same time, it is often the personnel intention of these companies.

Webb and Chaffer (2016) proved that the university teachers are paying too much attention to the professional aspects of practical training at the expense of the development of soft competencies. This method of education and training for the accounting profession in the Czech environment would meet the requirements of the Czech employers in relation to the employees - financial accountants - and can be inspiring. It is necessary to mention that information and language literacy should be improved, especially using English language in accounting. However, these procedures should not obscure the importance of soft competencies. Therefore, it is necessary to balance the importance of professional and soft competencies development regarding the preparation of students for the accounting profession. It is also necessary to adjust educational programmes (Aris et al., 2013; Asonitou and Hassall, 2019; Moore and Morton, 2017) to support an interpersonal formation of personality. According to the latest research, the development of expertise and soft competencies can be balanced in several ways - through subject innovation, the introduction of extra-semester courses supporting employers' required competencies (Roberts et al., 2020), or with the help of inclusion of modern technologies in curricula and teaching (Brownstein, Murad and Hunt, 2015). Furthermore, it is possible to use a training method of teaching based on experiential and practical learning (Zueva et al., 2020). This method is especially important for preparation for the accounting profession.

Students consider soft competencies to be more important than professional competencies. The result identifies to some extent with the study (Manzoor et al., 2018), because even at the level of the Czech environment, employers, and students in the fields of Accounting and Finance perceive the importance of competencies differently. Students' awareness of the requirements connected to the accounting profession is low, because the competencies important for students (soft competencies) are not significant for employers. The results of the research are in contradiction with the study (Manzoor et al., 2018), as the Czech students pay closer attention to the soft competencies. Regarding gender, no significant differences among students in their perception of the importance of professional and soft competencies were found. Significant differences in the perception of both groups of competencies importance were not found also from the university perspective. In the Czech Republic, we can find a contradiction in students' and employers' perception regarding the importance of competencies in the field of accounting profession. In the international context, the employers put more emphasis on professional competencies connected with accounting profession, while students are focused more on expertness. This fact may be influenced by the conceptual education approach, which is different internationally in comparison with the Czech conditions. Czech education is more oriented to the facts and memorization, which may result in students' perception of soft competencies as more important. The reason is that students may perceive the lack of development of such abilities. Students' perspectives offer another dimension for education and training in the accounting profession, as their awareness of future employment can influence innovation in practical job preparation (Kirstein, Coetzee and Schmulian, 2019).

LIMITATION OF RESEARCH STUDY

On the other hand, the research study has also some limitations. We can find the main limitation in lower research sample and in the research concentration just on two regions and two universities. We can also discuss the methods used for selection of companies from the capital city of Prague region, as the total number of companies has been reduced. The authors decided for this reduction to maintain comparability of the number of subjects in both regions with regard to the 15 competencies examined, which were included in the advertisements. This fact, of course, has limited research to some extent. For this reason, the study will continue to expand the sample of employers and university students in future. The extension of the sample will offer deeper research regarding the dependence

of the perception of professional and soft competencies importance for employment on factors such as year of study, nationality, previous work experience, school success, interest in studying, subject, etc. Then it will be possible to use more sophisticated research and statistical methods regarding the character of data.

CONCLUSION

The empirical study brought new theoretical facts to the field of professional and soft competencies of accountants regarding their importance for employers and students at universities of economics. It is possible to remind a few theoretical consequences of this study. In the Czech environment, there are different relationships in comparison to these ones confirmed by a few international studies. The professional competencies of employees - accountants - are important for the Czech companies. At the same time, these competencies appear the most in advertisements. It is especially information literacy and skills regarding English language in accounting. Development trends in economy also influence the fields of accounting, which results to companies' higher requirements on accountants due to the higher society needs. However, the perception of employers is not in line with the importance of competencies perceived by students who would like to work in the accounting profession.

For students, soft competencies are the crucial one, which may be caused by the way in which practical training is approached by academics (teachers), who are the main educational actors. The practical consequence of this study is the need to focus on innovative practices of educational programmes, whose main aim is to meet the requirements in the labour market and the requirements of employers to prepare students for their future profession and their possible success in the labour market in the best way. Therefore, in the future, the study will be extended by other respondents - not only by students, but also by other relevant companies in other regions of the Czech Republic. Attitudes towards the importance of competencies will be also possible to examine in terms of, for example, cultural differences, students' interest in the accounting profession or their possible practice in an accounting position.

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