

Classroom Climate of first Year Students at a selected Secondary Vocational School after the Covid-19 Pandemic

Helena Zelníčková¹, Jan Válek², Petr Sládek³

DOI: <https://doi.org/10.53349/resource.2023.is1.a1206>

Abstract

The paper addresses the issue of classroom climate after long-term online education in a selected vocational school. Long-term distance learning in the context of the Covid-19 pandemic has significantly affected the whole concept of education in the 2020/2021 school year. As a result of long-term distance learning, social bonding within classroom collectives has weakened, especially among first-year students at different school levels.

In the research part of the article, the results of a research investigation at the Secondary vocational School of Informatics, Postal Administration and Finance in Brno are presented. The research was focused on the quality of the classroom climate of selected first-year technical and non-technical fields of study. The findings show Covid-19 had an impact on the environment of the school classrooms studied. The research was carried out after students returned to full-time teaching in June 2021 Mareš & Ježek (2012). The questionnaire was used to conduct the research investigation about School Classroom Climate.

Keywords: School classroom climate, Social bonding, Distance learning

¹ DTI University, s.r.o, Dukelská quarter 1404/613 SK - 018 41 Dubnica nad Váhom, Slovak Republic.

E-mail: helena.zelnickova@cichnovabrno.cz

² Masaryk University, Faculty of Education, Department of Physics, Chemistry and Vocational Education, Poříčí 7, 603 00 Brno, Czech Republic.

E-mail: valek@ped.muni.cz

³ Masaryk University, Faculty of Education, Department of Physics, Chemistry and Vocational Education, Poříčí 7, 603 00 Brno, Czech Republic.

E-mail: valek@ped.muni.cz

1 Introduction

The Covid-19 pandemic caused the long-term closure of all types of schools, not only in the Czech Republic. Students were educated using various educational platforms (Zelníčková, Vorel & Marinič, 2021). Unfortunately, as a result, the group dynamics of school classes have been disrupted. The disruption of classroom dynamics has particularly affected students in the first year of secondary vocational schools.

The school classroom, specifically its climate, has a substantial impact on the education of students and strongly affects the development of social skills of all class members. Students acquire their position in the social group, in the classroom, over time (Kroupová, 2016, p. 301). However, this only applies if the students can meet in a school as part of their full-time education. Distance learning has limited adolescents' social contact. According to Portešová (2014, pp. 9-12), this does not lead to the harmonious development of the adolescent and may also endanger his/her mental health. The adolescent may transfer the problems caused in this way to the classroom after returning to full-time teaching.

The empirical part of the paper uses partial results of the Advanced master's state examination thesis of Zelníčková (2022), which dealt with the climate of first-year classes at the Secondary Vocational School of Informatics, Postal Administration and Finance in Brno, just after the return of students from long-term distance learning.

2 The Climate of the School Classroom

A school class is a unique social group that is formed based on predefined criteria (Výrost, Slaměník & Sollárová, 2019, p. 241). It is very important from the very beginning that students are required to follow the rules that are most often laid down in the school rules. However, students set their own internal norms even within the school community. According to Čapek (2008, p. 125), the climate of a school classroom can be characterized by its emotional and social mood. The development of good interpersonal relations is facilitated by school adaptation courses, which allow students to get to know each other. At the same time, the class teacher can get to know his/her students better.

The Covid-19 pandemic interrupted the familiarisation process and the natural evolution of the social climate in Czech school classrooms at the beginning of October 2021. The first year of high school can be considered a major milestone in a student's life. On entering secondary vocational school, the student's attention is diverted away from the family and focuses more on their peer group (Gillernová & Krejčová, 2012, p. 201). The adolescent spends most of his time at school. The quality of the classroom climate thus shapes his entire personality. Finding out the true state of the school classroom climate is complicated. That is because the school classroom is composed of students with different personalities, who have different statuses, and their families are from different socioeconomic backgrounds (Čapek,

2015, p. 545). Even a classroom teacher who knows his/her students perfectly can sometimes find it difficult to gauge the true state of his/her classroom climate.

For adolescents, diagnosing relationships in the classroom is problematic for another reason. Students no longer fully respect the authority of teachers and form different groups within the school classroom. They may also deliberately act against all the classroom rules to stand out personally. School classes of adolescents are conformist and often tolerant of various pathological phenomena within their group (Janošová, 2016, p. 315). Therefore, the main goal in studying the quality of the classroom climate is to capture the students' subliminal feelings and describe the existing interpersonal relationships. Mareš (1998, pp. 8-11) describes the following basic approaches to studying in the school classroom:

- *The sociometric approach* – focuses on the school class as a social group. It studies social relationships and their development. In this case, the SORAD questionnaire (based on the Czech words SOciometric-RAting Dotazník = mean questionnaire) is used as a research case.
- *Organizational-sociological approach* – the object of interest is the class teacher as the organizer of the teaching process and the school class as a unit. The method of research is standardized observation in pedagogical interaction.
- *Interaction approach* – the object of study is the interaction between teachers and students in the classroom. Standardized observation, video recordings and interaction analysis methods can be used to investigate this.
- *Educational-psychological approach* – the study focuses on the teacher and the school classroom. The subject of interest is the cooperation of students in the classroom. The research method is the "Classroom Life Instrument (CLI) assessment scale, (Mareš, 1998, p. 9)"
- *School-ethnographic approach* – the object of interest is the school classroom, teachers and school life. The research method is based on participant observation.
- *A developmental psychological approach* focuses on the student and the classroom as the social environment in which the student develops. The focus is primarily on the period between the 5th and 8th grades of compulsory schooling.
- *The social-psychological and environmentalist approach* – the classroom is seen as a place of education for students. Assessment scales are used as a research method to catch respondents' attitudes.

Partial results of Zelníčková's Advanced Master's state examination thesis research (2022), where a *social-psychological and environmentalist approach* was used, are published in this paper.

3 Empirical Part

In the following chapters of the paper, we will focus on identifying the quality of the classroom climate in the first-year classes of a selected vocational high school after the Covid-19 pandemic.

3.1 Main Research Problem

“What is the state of the school classroom climate in the classrooms of the selected secondary vocational schools after the Covid-19 pandemic from the perspective of the selected school classes?”

3.2 Characteristics of the Research Sample

The school classroom climate was studied at the Secondary Vocational School of Informatics, Postal Administration and Finance in Brno. The respondents were classroom teachers in the first year of technical or business and service fields. Due to the high number of first years at the school, the selection was narrowed to six classes and their teachers. The main intention was to create a diverse mix of classroom teachers according to their length of teaching experience, gender and willingness to participate in our research. Another criterion for selecting a classroom teacher was that the classroom teacher must have taught at least one subject in his/her school classroom. The research included the first year of engineering programmes students (SŠIPF, 2022):

- *Data security* – a four-year study programme (ISCED 1997 3A) with a school-leaving exam (in Germany mean Abitur).
- *Intelligent networks and devices* – three-year course (ISCED 1997 3C).
- *Information and security technologies* – a four-year study programme (ISCED 1997 3A) of study with a high school diploma and teaching.

At the same time, the first years focused on business and services (non-technical fields) were included in the research (SŠIPF, 2022):

- *Logistics and transport* – a three-year field of study (ISCED 1997 3C).
- *Logistics* – a four-year study programme (ISCED 1997 3A) with a school-leaving exam (in Germany mean Abitur).
- *Banking and insurance* – a four-year study programme (ISCED 1997 3A) with a school-leaving exam (in Germany mean Abitur).

The research was conducted in early June 2021, immediately after students returned to school after distance learning. The research was also implemented with regard to the continuously changed regulations of the government of the Czech Republic in the field of distance and full-

time education. We also considered the difficulty of students' adaptation to full-time teaching and the school-leaving exam. The procedure of research implementation was re-evaluated several times. Due to the overload of teachers and reduced willingness to cooperate in the research, the method of interviewing class teachers was abandoned during the implementation of the research and an electronic questionnaire was left to be distributed among the students.

3.3 Research Instrument Design and Hypothesis Formulation

Mareš & Ježek's (2012) questionnaire was chosen as the research instrument for interviewing students, focusing on identifying the quality of eleven psychosocial aspects related to classroom climate. The main advantage of Mareš & Ježek's (2012) questionnaire is its wide applicability ranging from second-grade primary school pupils to secondary vocational school students. Mareš & Ježek (2012) based the questionnaire on the existing MCEI (Carroll, 2006) and WIHIC (Fraser, McRobbie & Fisher, 1996) questionnaires.

The Multicultural Classroom Environment Instrument (MCEI) is a questionnaire that measures the multicultural environment of the school classroom (Carroll, 2006) and the WIHIC Questionnaire, is currently one of the most cited questionnaires that provides information about the educational environment. The questionnaire contains seven of the eight scale items (Scordi & Fraser, 2019).

Mareš & Ježek (2012, p. 15) questionnaire is organized into 7 mandatory subscales, which contain a total of 34 mandatory questions. In addition, the questionnaire contains a total of 4 optional subscales with 19 mandatory questions. To evaluate the questionnaire, it is necessary to calculate the individual scale scores of a certain scale for each student. Scores for the entire class are calculated by determining the median scaled scores obtained from the scaled scores of individual students.

The quality of the school classroom climate is evaluated by a final comparison of the median scale values according to a table created by the authors of the questionnaire (Mareš & Ježek, 2012), which is based on their own research. We evaluated each subscale separately, as each one has its own specific values (Mareš & Ježek, 2012, pp. 21-23).

3.4 Interpretation of Results

Considering the research goals and the structure of the questionnaire, a total of seven sub-research questions and seven hypotheses were formulated. The paper will publish the results of two partial research questions and a total of five hypotheses.

First research question PRQ1: What is the rapport of first-year students after distance learning?

Hypothesis H1: After long-term distance learning, first-year males have a better rapport with their classmates than females.

The hypothesis was based on Vágnerová's (2012, p. 431) findings describing differences in the number of friends by gender. Vágnerová (2012, p. 431) states that men have more friends. Wagner reports that a total of 77% of older male adolescents reported having 5 or more friends. For women, the number is lower, but their relationships are deeper. As first-year students are in the transition period between puberty and younger adolescence, it is likely that they bring some behavioural patterns from their earlier years of life. In addition, boys mature later and the period of older puberty extends until the age of 15, the age at which students enter their first year of secondary (vocational) school (Gecková & al., 2000 in Langmeier & Krejčířová, 2006, p. 143). Given the number of male friends, it can be assumed that men will relate better and faster to other classmates.

The null and alternative hypotheses were established before evaluating the obtained data:

Null hypothesis H10: Gender does not affect the quality of classmates' relationships after long-term distance learning.

Alternative hypothesis H1A: After long-term distance learning, first-year males have better relationships with their classmates than females.

The Cronbach's alpha coefficient value is $\alpha = 0.79$ and is in the range of statistically acceptable values. The value of Cronbach's coefficient from the original research by Mareš & Ježek (2012) is $\alpha = 0.86$, which is already considered an optimal value. The degree of freedom $df = 2$ was set based on the calculations. The critical chi-square value is $\chi^2_{crit} = 5.991$. The value of the test criterion that was calculated ($\chi^2_{calc} = 2.147$) is lower than the critical Chi-square value. The calculated value of $p_{calc} = 0.342$ is higher than the critical significance level of $p_{crit} = 0.05$. After comparing all the calculated values, it can be concluded that the alternative hypothesis H1A is rejected, and the *null hypothesis H10 is accepted*.

Result for Hypothesis H1: Gender does not affect the quality of relationships between classmates after long-term distance learning.

Hypothesis H2: After a long period of distance learning, first-year females make a greater effort to ingratiate themselves with their classmates than males.

The hypothesis was formulated based on the findings of Langmeier & Krejčířová (2006), who state that sexual identity is achieved in adolescence and adolescents try to accept the role of women and men in society. Girls are thus subjected to strong social pressure as they try to fulfil the role of adult women. Boys are less pressured to fulfil the male role and thus gain a social advantage compared to girls (Janošová, 2008, p. 210). Based on the above facts, it can be assumed that girls under the impact of social pressure will exert high peer pressure to please their classmates in the school classroom.

The null and alternative hypotheses were established before evaluating the obtained data:

Null hypothesis H20: The gender of the respondent does not affect his/her efforts to please his/her surroundings.

Alternative hypothesis H2A: After a long period of distance learning, first-year females make greater efforts than males to ingratiate themselves with their classmates.

The value of Cronbach's alpha coefficient is $\alpha = 0.74$ and is comparable to the value made by Mareš & Ježek (2012). The value of α is within the range of statistically acceptable values. The value of the original research by Mareš & Ježek (2012) was $\alpha = 0.73$. The degree of freedom $df = 2$ was set based on the calculations. The critical chi-square value is $\chi^2_{crit} = 5.991$. The value of the test criterion that was calculated ($\chi^2_{calc} = 2.115$) is lower than the critical Chi-square value. The calculated value of $p_{calc} = 0.347$ is higher than the critical significance level of $p_{crit} = 0.05$. After comparing all the calculated values, it can be concluded that the alternative hypothesis H2A is rejected, and the *null hypothesis H20 is accepted*.

Result: The gender of the respondent does not influence his/her efforts to please his/her surroundings.

Hypothesis H3: Technically oriented students have better relationships with their classmates than business and service students.

The hypothesis was formulated based on Macek's (2003) assertion that peer conformity increases in importance in early to middle adolescence. The adolescent seeks prestige and wants to be accepted by the social group. Friendship among boys is collective and is oriented towards common hobbies and interests. Zelníčková's Advanced Master's state examination thesis (2022) formulates a hypothesis based on the fact that technically oriented majors are perceived as prestigious at the selected secondary vocational school. Boys predominate in the first years of the technical fields studied, compared to the business and service fields, where the groups are heterogeneous in terms of gender composition.

The null and alternative hypotheses were established before evaluating the obtained data:

Null hypothesis H30: Respondents' field of study does not affect the intensity of their relationships with classmates.

Alternative hypothesis H3A: Technically oriented students have better relationships with their classmates than business and service students

The Cronbach's alpha coefficient value is $\alpha = 0.79$ and is in the range of statistically acceptable values. The value of Cronbach's coefficient from the original research by Mareš & Ježek (2012) is $\alpha = 0.86$, which is already considered an optimal value. The degree of freedom $df = 2$ was set based on the calculations. The critical chi-square value is $\chi^2_{crit} = 5.991$. The value of the test criterion that was calculated ($\chi^2_{calc} = 2.115$) is lower than the critical Chi-square value. The calculated value of $p_{calc} = 0.347$ is higher than the critical significance level of $p_{crit} = 0.05$. After comparing all the calculated values, it can be concluded that the alternative hypothesis H3A is rejected, and the *null hypothesis H30 is accepted*.

Result: respondents' field of study does not affect the intensity of his/her relationships with classmates.

All hypotheses (H1, H2, H3) formulated in PRQ1 were rejected.

The studied disciplines do not disturb students' relationship after distance learning. The natural development of school classes as small social groups is probably delayed.

Second research question PRQ2: Has long-term distance learning affected students' approach to learning?

Hypothesis H4: First-year students in Business and Services exert more effort in learning than students in technically oriented fields.

The hypothesis was based on the findings of Vokál, Šmahel & Dědková (2021, p. 2). Vokál, Šmahel & Dědková, in their research on adolescents' excessive use of the Internet during Covid-19 found that adolescents spent more time on the Internet during distance learning. However, the number of adolescents spending 7 hours or more online has doubled. Zelníčková (2022) assumes that students who study technically oriented fields focusing on IT technologies spend more time with smart technologies, also thanks to distance learning. Therefore, they do not need to make an increased effort to learn because even in their free time, they acquire the necessary knowledge and skills to complete the learning. Compared to students from technically oriented fields, business and service-oriented fields such as logistics and banking have to make a higher effort to learn.

The null and alternative hypotheses were established before evaluating the obtained data:

Null hypothesis H40: Respondents' field of study does not affect their learning efforts.

Alternative hypothesis H4A: First-year students in the Business and Service fields exert a higher effort in learning than technically oriented students.

The Cronbach's alpha coefficient value is $\alpha = 0.87$ and is in the range of statistically acceptable values. The value of Cronbach's coefficient from the original research by Mareš & Ježek (2012) is $\alpha = 0.86$. The degree of freedom $df = 2$ was set based on the calculations. The critical chi-square value is $\chi^2_{crit} = 5.991$. The value of the test criterion that was calculated ($\chi^2_{calc} = 0.483$) is lower than the critical Chi-square value. The calculated value of $p_{calc} = 0.785$ is higher than the critical significance level of $p_{crit} = 0.05$. After comparing all the calculated values, it can be concluded that the alternative hypothesis H4A is rejected, and the *null hypothesis H40 is accepted*.

Result: Respondents' field of study does not affect their learning efforts.

Hypothesis H5: Students in the first year of Business and Services are more proactive in their studies after transitioning from distance to full-time education than students in technical fields.

The hypothesis was based on Zelníčková, Vorel & Sládek's (2021, p. 7362) findings that students procrastinate during distance learning. This may lead to demotivation of students and their slacking off in schoolwork. Because business and service students do not have the opportunity to use their vocational skills practically, as do students in technically oriented fields, they will likely have to take more initiative in full-time learning.

The null and alternative hypotheses were established before evaluating the obtained data:

Null hypothesis H50: Respondents' field of study does not affect their initiative in studying

Alternative hypothesis H5A: First-year students of the Business and Services field of study are more proactive in their studies than those of the technical field after transitioning from distance to full-time education.

The value of Cronbach's alpha coefficient is $\alpha = 0.67$ and is in the range where the results of Cronbach's alpha coefficient are weak. The value from the original research by Mareš & Ježek (2012) is $\alpha = 0.71$ and is in the acceptable range. The degree of freedom $df = 2$ was set based on the calculations. The critical chi-square value is $\chi^2_{crit} = 5.991$. The value of the test criterion that was calculated ($\chi^2_{calc} = 3.590$) is lower than the critical Chi-square value. The calculated value of $p_{calc} = 0.166$ is higher than the critical significance level of $p_{crit} = 0.05$. After comparing all the calculated values, it can be concluded that the alternative hypothesis H5A is rejected, and the *null hypothesis H50 is accepted*.

Result: respondents' field of study does not influence their study initiative.

All hypotheses that were formulated under PRQ2 were rejected.

This is also confirmed by the results that were evaluated for the respondents.

It can be stated that long-term distance learning has negatively affected the students' overall approach to studying.

4 Discussion

A total of 120 questionnaires were distributed in the study. Altogether 103 valid questionnaires were received for processing. The return rate is 85.8%. The main limitation of the whole research was its local narrowness to one secondary vocational school. Specifically, Secondary Vocational School of Informatics, Postal Administration and Finance in Brno. The main goal of the research was to determine the state of classroom climate after long-term distance education.

Several studies confirm the negative effects of long-term distance learning on education and the psyche of teachers and students. Prokop & Marková (2020) study parents' opinions about distance learning. Bicanová, Gargulák & Prokop (2021) describe teachers' experiences with distance learning, and research by Bicanová, Kobrhel, Gargulák & Prokop (2021) focuses on the impact of the pandemic Covid-19 on students. All selected researches describe the direct experience of all actors in the educational process.

The evaluation of our research found that *students do not have disturbed relationships, and no differences in gender relations arise*. In this case, it can be assumed that social contact (albeit limited) between students via educational platforms could have positively impacted the outcome. Bicanová, Kobrhel, Gargulák & Prokop (2021) published the findings of their research where it was found that only 26% of primary school pupils reported a deterioration in their relationships with their classmates.

After evaluating the data obtained, it was further found that there were *no significant differences in access to study according to the field of study*. According to research by Prokop & Marková (2020), respondents tended to procrastinate during their studies and exert little activity in their studies. This was confirmed by parents who observed their children during distance learning. Up to 77% of parents admitted that their child was less motivated to study during distance learning. This is related to the experience of teachers after distance learning, who states that it is crucial to support students' motivation after their return to school (Bicanová, Gargulák & Prokop, 2021). As many as 77% of teachers reported that restoring students' initiative to learn would be crucial when they returned to school.

Based on the facts, it is possible to create an approximate plan for pedagogical intervention. It is crucial to bring discipline back to students through external action and create a state where students are forced to work on their personal discipline. This can translate into better study results later on, as well as the quality of the school climate. Our research has only confirmed the necessity to create an extensive national survey targeting second-grade primary school pupils and first-to-third-year secondary school students.

5 Conclusion

Long-term distance learning did not allow students to be present in person at school and thus deprived them of many beautiful moments with their classmates. While this form of teaching allowed for the transfer of knowledge to students, it eliminated the crucial social contacts for adolescents. After evaluating all the sub-research questions and related hypotheses, it can be concluded that students themselves do not experience relational problems after distance learning. However, the low motivation of students to do schoolwork is very problematic, as is the low initiative to study.

Thanks to Covid-19, all participants in the educational process passed the stress test. Nowadays, it is necessary to make students work hard to fill in their missing knowledge and skills. These skills and knowledge need to be built systematically. Unfortunately, they cannot be built simultaneously in all subjects taught. Therefore, a new challenge is opening for the Czech education system, which will shape the next generation of students entering secondary vocational schools. Covid-generation comes to secondary vocational schools.

References

- Bicanová, J., Gargulák, K., & Prokop, D. (2021). *Zkušenosti českých učitelů s distanční výukou* [Online]. In [Online]. <https://drive.google.com>
- Bicanová, J., Kobrhel, V., Gargulák, K., & Prokop, D. (2021). *Dopady pandemie covid-19 na žáky* [Online]. PAQ Research and Kalibro Projekt s.r.o. <https://drive.google.com/file>
- Carroll, M. J. (2006). *An Investigation into Students' Perceptions of Multicultural Classroom Environment in Queensland Catholic Secondary Schools* (Doctoral Dissertation). Virginia: Australian

- Čapek, R. (2008). *Odměny a tresty ve školní praxi*. Prague: Grada. Teacher and parent: Cooperation, class meeting, communication
- Čapek, R. (2015). *Moderní didaktika: lexikon výukových a hodnoticích metod*. Prague: Grada.
- Fraser, J. B., McRobbie, C. J. & Fisher, D. L. (1996). *Development, Validation and Use of Personal and Class Form a New Classroom Environment Instrument*. New York: Annual Meeting of the American Educational Research Association
- Gillernová, I., & Krejčová, L. (2012). *Sociální dovednosti ve škole*. Prague: Grada.
- Janošová, P. (2008). *Dívčí a chlapecká identita: vývoj a úskalí*. Praha: Grada.
- Janošová, P. (2016). *Šikana a školní třída na začátku dospívání*. In P. Janošová, L. Kollerová, K. Zábrodská, J. Kressa, & M. Dědová, *Psychologie školní šikany* (pp. 307-337). Praha: Grada Publishing.
- Kroupová, K. (2016). *Slovník speciálněpedagogické terminologie: vybrané pojmy*. Praha: Grada
- Langmeier, J., & Krejčířová, D. (2006). *Vývojová psychologie* (2nd updated ed.). In (2nd updated ed.). Prague: Grada Publishing.
- Macek, P. (2003). *Vývojové změny v adolescenci ve světle novějších empirických výzkumů* [Online]. <https://nakladatelstvi.portal.cz>
- Mareš, J. (1998). *Sociální klima školní třídy (Přehledová studie)*. Hradec Králové.
- Mareš, J., & Ježek, S. (2012). *Klima školní třídy: dotazník pro žáky*. Praha: Národní ústav pro vzdělávání.
- Portešová, Š. (2014). *Rozumově nadaní studenti s poruchou učení: cesty od školních výkonových paradoxů k úspěchu*. Brno: Masarykova univerzita.
- Prokop, D., & Marková, L. (2020). *Distanční vzdělávání na jaře a podzim 2020: Pohled rodičů* [Online]. Retrieved September 11, 2022, <https://www.ucitelnazivo.cz>
- Skordi, P., & Fraser, B.J. (2019). *Validity and use of the What Is Happening In this Class? (WIHIC) questionnaire in university business statistics classrooms*. *Learning Environments Research*, 22 (2), 275–295. <https://doi.org/10.1007/s10984-018-09277-4>
- SŠIPF Brno. (2022). *Studijní obory* [Online]. Retrieved October 12, 2022, Secondary Vocational School of Informatics, Post and Finance Brno website: <https://www.cichnovabrno.cz/uchazeci/studijni-obory>
- Vágnerová, M. (2012). *Vývojová psychologie: dětství a dospívání* (Second Edition, Completed and Revised). In (Second edition, supplemented and revised). Prague: Karolinum.
- Vokál, D., Šmahel, D., & Dědková, L. (2021). *Excesivní používání internetu českými dospívajícími: Srovnání před a během pandemie covid-19*. [Research report]. Masaryk University.
- Výrost, J., Slaměník, I., & Sollárová, E. (2019). *Sociální psychologie: teorie, metody, aplikace*. Prague: Grada.
- Zelníčková, H., Vorel, D., & Marinič, P. (2021). *Využití Microsoft 365 technologií při výuce ekonomických předmětů na střední odborné škole* [Online]. In M. Klement & kol., *Trendy ve vzdělávání* (45). <https://doi.org/10.6027/1604-1604.2021045>
- Zelníčková, H., Vorel, D., & Sládek, P. (2021). *Comparative study: Distance education of students at vocational schools and of members of the armed forces*. In L. Gómez Chova, A. López Martínez, & I. Candel Torres, *INTED2021 Proceedings* (7357-7365). Spain: IATED Academy.
- Zelníčková, H. (2022). *Klima školní třídy prvních ročníků střední odborné školy po distančním vyučování – covid-19* (Rigorous theses = Advanced Master's state examination thesis). Brno.