Full research paper

GENDER DIFFERENCES IN SCHOOL ACHIEVEMENT AND ATTITUDES TOWARDS MOTIVATION IN SECONDARY ECONOMIC EDUCATION

Jaromír Novák[1]✉
Kateřina Berková[2]
Andrea Kubišová[3]
Dana Kolářová[4]

[1]Competence Centre, Faculty of Economics and Finance, University of Economics in Bratislava, Slovakia

[2]Department of Economic Teaching Methodology, Faculty of Finance and Accounting, Prague University of Economics and Business, Czech Republic

[3]Department of Mathematics, College of Polytechnics Jihlava, Czech Republic

[4]Department of Hospitality, University College Prague, Czech Republic

✉ jaromir.novak@euba.sk

ABSTRACT

This study examined the school achievement and attitudes of Czech and Slovak secondary school students (n = 572; age: 17-19) towards motivation in economic subjects. The aim was to analyse the factors of students' motivation, their relations with selected teacher's competences, and students' school achievement with regard to their gender. The data were obtained by using a questionnaire and analyzed by Mann-Whitney U-test, Pearson, and Spearman correlation coefficients. Girls performed better than boys in all the subjects analysed. At the same time, for all factors of motivation with significant gender differences, their motivation was stronger compared to boys. School achievement and attitudes towards selected motivation factors are correlated. Some factors motivating boys with better achievement motivate girls with worse achievement.

KEYWORDS

Gender differences, school achievement, motivation, teacher personality, economic education, secondary schools

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Highlights

- *School achievement and attitudes towards selected motivation factors are correlated.*
- *Gender differences were found in attitudes towards motivation in economic subjects.*
- *Girls perform better than boys in all of the analysed school subjects.*
- *Girls spend more time per week studying both economic subjects compared to boys.*

INTRODUCTION

Students' school achievement depends primarily on the performance of the students. The theory assumes that this is determined mainly by their ability, motivation, and learning climate, including the teaching methods chosen and their fit with students' learning styles. Apart from the relevant abilities of students, their self-regulation, self-efficacy, and fear of examinations can be considered as the best predictors of school achievement (Pintrich and de Groot, 1990). However, the cited study does not consider motivational beliefs that the curriculum is useful and interesting as a sufficient guarantee of school achievement. On the contrary, the OECD (2010) infers from the PISA results that students may be motivated to study because of the relevance of the subject to their future education or career. The study mentions that students' attitudes towards the subject should be related to school success, but it is not clear if educational success brings about better attitudes or if a positive attitude towards subjects is a key factor motivating students to learn.

The big challenge for teachers is how to make the best use of all these attributes. Successful teachers see knowledge and skills as something built up over time, so they move away from traditional, direct teaching to methods that stimulate active learning. In this context, motivation occupies a significant role in students' learning. Many studies have examined factors with an impact on motivation and school achievement (e.g., Coetzee et al., 2020; Demirbas and Demirkan, 2007; Giota and Bergh, 2021; Marmeleira et al., 2020; Owoseni et al., 2020; Silva-Arias et al., 2020; Zhang and Wang, 2020). Statistically significant differences in motivation and school achievement in terms of

gender, school type, subject, age, year of study, learning style, and socio-economic background have been found, but they have not always been confirmed in a truly consistent manner, and in some studies, they have not been demonstrated at all. Moreover, the studies usually analyze school achievement in traditional subjects such as mathematics, languages, or science. Therefore, it is interesting to examine whether the results would be similar in the field of secondary economic education, which is an example of vocational education where students' motivation to study might be different from that in the subjects forming their general education.

To effectively manage motivation in the school environment and promote active learning and thus school achievement, it is necessary to know students well and understand the differences that may arise between different students and their groups, for example, due to gender differences. This consideration is supported by an OECD study (2009:8), according to which "*educational policy has to take into account the existence of gender differences in performance to be effective in promoting quality student outcomes and equity*."

LITERATURE REVIEW

Gender differences in students' school performance

Gender differences are reflected in a variety of ways in the field of education. The findings of major international studies and comparisons (e.g., PISA) show that there are large gender differences in students' performance and attitudes in different countries and that they also vary according to the areas tested. Although the OECD itself sees the main reason for studying gender differences as being able to understand the origins of gender inequalities better, it also sees the possibility of improving average student performance through such research and better understanding how students learn as an important reason (OECD, 2009).

In relation to school performance, the majority of studies tend to confirm some advantages of girls over boys, although these differences may vary according to educational areas, etc. Gender differences in students' performance in language, mathematics, and science are the most frequently examined. Particularly valuable for making general statements are the results of meta-analyses summarizing the findings of a large number of studies (e.g., a generalizing study on school performance by Voyer and Voyer, 2014; or a meta-analysis focusing on school performance in mathematics by Lindberg et al., 2010). The former meta-analysis is based on a large sample of heterogeneous studies examining gender differences in school performance. It found a statistically significant difference in school performance in terms of grades in favor of girls in all educational domains examined, with the largest differences in favor of girls shown in language and the smallest in mathematics. The fact that mathematics is the least distinct and unambiguous area in terms of gender differences is confirmed by studies that found no statistically significant differences in mathematics performance by gender at all (e.g., Agyei and Eyiah-Bediako, 2008; Lindberg et al., 2010).

The study by Eriksson et al. (2020) confirms the existence of gender differences in learning outcomes in subjects based on abstract-visual thinking. Coetzee et al. (2020) also confirmed that girls perform better than boys (especially in language, only very slightly better in mathematics). A similar conclusion was reached in a longitudinal study of about 70,000 English children, which found that girls performed statistically significantly better in all subjects studied except physics (Deary et al., 2007).

A number of other studies have examined gender differences in school achievement in selected samples of learners, with mixed findings. The study by Marmeleira et al. (2020), while confirming better grades for girls than boys in several subjects (Portuguese, Philosophy, Mathematics, Foreign Language, Biology/Geology, and Psychology), did not find statistically significant gender differences in other subjects (Physics/Chemistry, Geography and History). A specific educational area is physical education, in which this study and several other studies have confirmed gender differences in performance in the opposite direction, i.e., boys perform better in this subject. Demirbas and Demirkan (2007:345) confirmed that *"scores of females were higher in artistic and fundamental courses and in the semester academic performance scores"* but, conversely, *"performance scores of males were higher in technology-based courses"*, supporting the idea that gender differences may differ depending on the subject of study. Therefore, we decided to examine gender differences in secondary economic education, represented in our study by two major school subjects: economics and accounting.

Key factors influencing students' school achievement from a gender perspective

School achievement is determined by a number of factors. Many studies emphasize that teachers and their professional characteristics are important factors influencing students' academic success (Chetty et al., 2014; Rivkin et al., 2005; Rockoff, 2004; Fung et al., 2017). Other factors include students' abilities and motivation, as well as fear of exams and stage fright (e.g., Pintrich and de Groot, 1990), which are usually more evident in girls than boys (Chmelárová et al., 2018). This conclusion is also supported by a study whose results are significant because it simultaneously examined gender differences in school achievement in the same sample, failing to confirm lower school achievement for girls compared to boys (Núñez-Peña et al., 2016). Therefore, it can be assumed that other factors influence school achievement in a more significant way. At the same time, increased fear of exams might be associated with a more responsible approach to studying and higher levels of self-discipline. This reasoning is supported by the results of an analysis of the goal orientation of secondary school students (Erdem-Keklik and Keklik, 2014), which revealed significant gender differences. Within the chosen structure of factors of goal orientation, girls' goal orientation was particularly confirmed to be more oriented towards not failing, which, although increasing their fear of exams, also contributed to their better school performance through a more responsible approach to studying. According to Giota and Bergh (2021), girls have a stronger Social responsibility, as well as Mastery and a greater orientation towards Future than boys.

Student motivation is considered one of the crucial factors determining the effectiveness of the educational process (Fontana, 2014). Teaching is more effective if teachers "*reinforce students' self-concept and confidence in their own abilities and show students that it is worth investing time and effort in learning because it is an investment with ample returns*" (Habók et al., 2020:10). Eriksson (2020) studied students' motivation to learn mathematics in 50 countries and found that gender differences in interest in the subject are related to differences in student achievement. The factors that influence the intensity of motivation are numerous. In general, the two most fundamental characteristics of a teacher's influence on students have been shown to have a positive effect: emotional intelligence and teacher's self-efficacy (Valente et al., 2020). The content of the issues studied, the students' strictness about themselves, and their expectations from their studies cannot be overlooked (Berková et al., 2018). An individual's expectations and their fulfilment can be considered important for the intensity of motivation. Research by Perelygina et al. (2020) also shows that increasing students' motivation depends on the motivation of the teacher to perform their profession. This is reflected in their teaching style, choice of teaching methods, and emotional intelligence in relation to the profession (Krpálek and Krpálková Krelová, 2016).

Higher student motivation usually leads to greater learning activity, which increases learning effectiveness. Several studies have shown that girls are usually more engaged in the learning process than boys. If teachers want to encourage students to be active, they should adjust teaching and learning methods and tools to their gender. For girls, support and assistance aimed at a better understanding of the curriculum covered have a better effect on increasing engagement; for boys, clearer structuring of learning activities has a greater impact (Bru et al., 2021). According to the study by Lebid and Shevchenko (2020), there are also gender differences in the perception of interactive learning methods - they were perceived more favorably by girls than boys in the sample studied, both in terms of their effectiveness and appropriateness. This also points to the importance of tailoring the choice of appropriate teaching methods to the gender of the students.

This study analyses gender differences in school achievement and students' attitudes towards motivation in secondary economic education, where these relations are relatively under-researched. A research study (Berková et al., 2018) examined interdisciplinary differences in attitudes towards motivation, but it focused on students in higher economic education. Students in Finance and Management, and Applied Computer Science consider as the most motivating factors when the teacher leads them to think, accepts unusual ideas and discusses them, gives more than facts, and uses real-life examples. The research found that students of technical majors had greater demands for studying than students of economic majors, who were more indifferent to studying.

An OECD study (2014) confirmed a significant positive relation between numeracy and financial literacy. Economic education is based on many mathematical principles and logic theory and is characterized by the following cognitive procedures - analysis, synthesis, deduction, and induction. The influential English economist J. M. Keynes stated that economics is a tool of thinking to make correct conclusions relevant in relation to the economic problem being solved (Jurečka et al., 2013), which emphasizes the connection between economics, thinking, and drawing correct conclusions. One of the main subjects of secondary economic education is accounting, which is not only based on economic theories and methods but also uses mathematical operations and the theory of logic. Thus, accounting functions in interactions are underpinned by alternative mathematical-analytical models (Watts and Zimmerman, 1978; Fields et al., 2001). Since economic courses demand critical thinking skills, reading comprehension should also be encouraged as they are interrelated skills (Wiliam, 2011). Stoet and Geary (2013) have found that in the area of language learning, the average girl always outperforms the average boy in reading. From the above, it can be deduced that language and mathematical skills are important prerequisites for studying economic subjects. In this study, the researchers also examined these questions in the field of secondary economic education, where they tested the validity of these relationships.

The purpose and objectives of the study

The research on the relation between school achievement and students' motivation focuses on gender differences, as several studies suggest (Coetzee et al., 2020; Demirbas and Demirkan, 2007; Giota and Bergh, 2021; Marmeleira et al., 2020; Owoseni et al., 2020; Silva-Arias et al., 2020; Zhang and Wang, 2020) that neither academic achievement nor motivation have the same tendency in education in terms of gender. The main purpose of this study is to examine gender differences in school achievement and the attitudes of students from Czech and Slovak secondary schools towards motivation in the profile secondary school subjects of economics and accounting.

Motivation is examined by students' self-assessment of how they believe a particular factor in the course might motivate them. Nine motivation factors are included in the model, which was inspired by the studies of Berková et al., 2018 and Perelygina et al., 2020. To better portray the attitudes towards motivation, students' attitudes towards the personality of the teacher of economics and accounting were further studied and split into the following professional competencies: (a) *expertise*; (b) *clear explanation*; (c) *responsiveness and empathy*; (d) *humanity, student's trust towards the teacher*; (e) *ability to motivate* (Akin and Kurbanoglu, 2011). To make it more contextual, the model also takes into account gender differences in time spent studying at home. The learning outcomes in economics and accounting are compared with those in mathematics and mother tongue in order to demonstrate the association of gender differences in economic subjects with differences in school achievement in the area of reading and mathematics (Stoet and Geary, 2013) and also to confirm the assumed relation between numeracy and financial literacy (OECD, 2014). Thus, the paper adds to the literature with new findings in relation to the teaching of economic subjects in secondary schools.

The main objectives of this study are:

- to analyse and compare the main findings of the existing studies about gender differences among students in their school achievement with respect to the key aspects of learning, mainly focusing on the relation between students' school achievement and their motivation to learn,
- to expand knowledge in the area of gender differences between high school students already confirmed for traditional high school subjects such as mathematics, sciences, languages, and the like by researching analogous relations within the scope of economic school subjects,
- to analyse whether and how these aspects are influenced by teachers of economic subjects and their personality.

In view of the previous studies that led to different results, the current study focuses on these two research questions: Do secondary school students differ in the key aspects of learning (motivation, preparation time, school achievement) from a gender perspective? Is there a link between these aspects in the level of the two profile secondary school subjects of economics and accounting?

The following hypotheses arise from the research questions and the main objectives of the study:

- **H1:** Students' attitudes towards motivation in the case of economics and accounting differ by gender.
- **H2:** Students' attitudes towards the teacher in the case of the economics and accounting courses differ by gender.
- **H3:** There are gender differences in the time taken by students to prepare for the subjects of economics and accounting.
- **H4:** There are gender differences in students' school achievement in the subjects of economics and accounting.
- **H5:** From a gender perspective, there is a correlation between preparation time and school success in the case of economics and accounting.
- **H6:** School success in the subjects of economics, accounting, mathematics, and mother tongue is correlated with gender.
- **H7:** There is a correlation between students' attitudes towards motivation and school achievement in the case of economics and accounting in terms of gender.

MATERIALS AND METHODS

Participants

The research involved secondary schools from the Czech Republic and Slovakia that provide quality economic education. The sample of secondary schools was chosen deliberately, the main criterion being close cooperation with both research institutes. The cooperation involves providing teaching training for future teachers of economic subjects. The selected secondary schools implement analogous study programs with a similar curriculum and, as faculty training schools, guarantee quality teaching of economic subjects. Teachers' approach to teaching is innovative, and they use not only traditional but mainly modern teaching methods, making their students' learning more experience-based.

A total of 7 secondary schools from the capital cities of both countries participated in the research. 577 students in their final (fourth) and pre-final (third) years were involved in the main research from these secondary schools. 572 questionnaires out of 577 were valid. 5 respondents were excluded from the total observation due to incomplete questions or ambiguous answers. The sample of students was drawn using purposive sampling. This method was adopted to obtain responses from upper-year students who have more experience with economic education and can assess their attitudes better. The research sample consisted of 392 girls (i.e., 68.5%) and 180 boys (i.e., 31.5%), which corresponds to the normal ratio of boys and girls at this type of school in both countries. The respondents studying the third year (total: 288) and the fourth year (total: 284) of secondary school were all 17-19 years old.

Data and instruments

The research was conducted as a quantitative study using the questionnaire method. The questionnaire was constructed as a non-standardized questionnaire, and the selection of variables was inspired by several national and international studies. The questionnaire was distributed to secondary schools and among students in hard copy from April to June 2018. Data was collected by the researchers personally, thus ensuring a higher return guarantee. Respondents were advised to answer as objectively as possible, with the understanding that the data collected were subject to a high degree of confidentiality and anonymity and would only be used for research purposes. The questionnaire consisted of several separate sections.

In the first section, students expressed their attitudes towards motivation in the subjects of economics and accounting. Motivation was expressed by 9 factors (Berková et al., 2018; Perelygina et al., 2020). The students expressed their attitudes towards each factor, separately for the subject of economics and the subject of accounting:

- Factor 1: the exposition emphasizes the curriculum's applicability to real-life situations.
- Factor 2: the exposition is mainly focused on thorough practicing of the basic curriculum with simple examples.
- Factor 3: the teacher just explains the curriculum from the textbook.
- Factor 4: the teacher engages the students with frequent questions, allowing for discussion.
- Factor 5: the teacher uses examples from real life and case studies, and the problems raised are jointly solved and discussed.
- Factor 6: the teacher sets the task and lets the students work independently and individually.
- Factor 7: the teacher guides students to think about the curriculum, teaching them to critically evaluate information.
- Factor 8: the teacher accepts unusual ideas, evaluates their applicability, and shows how to learn from possible mistakes.
- Factor 9: the teacher is flexible and answers all questions, but does not deviate from the topic, communicating "something more" than just the facts.

A Likert scale was used to measure attitudes towards motivation in the subjects of economics and accounting, on which students expressed how the factors listed would motivate them. These were ordinal values: -2 strongly demotivating; -1 moderately demotivating; 0 don't care; 1 moderately motivating; 2 strongly motivating.

In the second section, students expressed their attitudes towards the personality of the teacher of economics and accounting. The teacher's personality was described by the following competences (Alharbi et al., 2020; Berková and Krejčová, 2016; Perelygina et al., 2020):

- Competence 1 – expertise
- Competence 2 – clear explanation
- Competence 3 – responsiveness, empathy
- Competence 4 – humanity, the student's trust in the teacher
- Competence 5 – ability to motivate students

Again, a Likert scale was used to measure student attitudes towards the teacher, on which students expressed their evaluation of the teacher from their perspective, i.e., the validity of a statement describing each characteristic accurately. These were ordinal values: from -2 to 2, with -2 expressing a low rating, 0 I don't care; and 2 a high rating.

In the third section of the questionnaire, students reported their weekly preparation time for the subjects of economics and accounting (each separately). Weekly preparation time was described using the following scale:

- More than 4 hours per week (5)
- 3 - 4 hours per week (4)
- 1 - 2 hours per week (3)
- Less than 60 minutes per week (2)
- I don't prepare for this subject at home at all (1)

The time variation was expressed in a scale of 1 - 5, i.e., again with ordinal values.

The fourth section related to the school achievement of students primarily in the subjects of economics and accounting, by means of the annual grade obtained by students at the end of their second year of study, with a range of 1 - excellent; 2 - very good; 3 - good; 4 - sufficient; 5 - insufficient. For better comparison with the results of other studies, the researchers also examined grades in the subjects of mathematics and mother tongue (Czech or Slovak). Accounting is based on mathematical operations and is based on the theory of logic (Fields et al., 2001). Accounting and economics use specific terminology, so it is important that students have a well-developed mother tongue to understand the text correctly and are able to analyse it and draw conclusions. For this reason, a combination of these four subjects was chosen to find gender differences and correlations at the level of all four subjects (Berková et al., 2020). School achievement represents an ordinal variable.

The fifth section included student demographic information, such as gender, high school name, city, and state. Respondents consented to the processing of their personal information. For the purposes of this research, any data that could be used to identify the respondent were encrypted or removed.

The validity of the questionnaire was established through a focus group research method conducted with 8 students in face-to-face mode (Langfeldt and Kyvik, 2011). It was one focal group of 90 minutes with two moderators - researchers. Due to the positive outcome of the content validation, no further methods were resorted to. The reliability of each subscale related to one construct was measured by calculating Cronbach's alpha. The results for each construct are shown below:

- Motivational factors for the subject of economics 0.523
- Motivational factors for the subject of accounting 0.630
- Teacher competences in the subject of economics 0.843
- Teacher competences in the subject of accounting 0.867
- Preparation time of the pupil 0.715
- School success rate in subjects 0.818

Appendix to this paper provides more detailed results of the Cronbach's alpha when the variable would be removed.

Data analysis

The original data obtained from the questionnaire survey are of several types. The variables expressing the descriptive characteristics of the respondents, i.e., high school name, grade, city and state are nominal variables, of which the gender variable is a dichotomous variable and is used as a sorting factor to conduct all comparative analyses. The data contain mostly numerical ordinal variables, i.e., student motivational factors and teacher professional competencies are expressed on a five-level Likert scale from -2 to 2, and educational achievement is represented by the final grade at the end of Year 2. Both types are commonly treated as numerical variables, the level is described by an arithmetic mean (Jamieson, 2004). Since these traits do not meet the requirement of normality (verified by the Shapiro-Wilk test), but meet the requirement of homogeneity of variances (verified by the Levene's test), the Mann-Whitney U test was selected from the two-sample tests to assess the hypotheses 1, 2 and 4. The Mann-Whitney U test is a non-parametric statistical test used to compare two independent groups or samples. It is often used when the assumptions for a t-test, such as normal distribution or equal variances, are not met.

This test is useful when the data is ordinal or skewed and cannot be assumed to follow a normal distribution. It is commonly employed in various fields, including social sciences, healthcare, and business research. The Mann-Whitney U test compares the distribution of values between the two groups and determines whether there is a significant difference between them. It is particularly effective in analyzing ranked or ordinal data, where the values are sorted in a particular order. To perform the Mann-Whitney U test, you need two independent samples from each group you want to compare. These samples can be of different sizes and can have unequal variances. The test assesses whether the observations from one group tend to be higher or lower than those from the other group. The test generates a U statistic and p-value as the output. The U statistic represents the rank-sum of the observations for one group relative to the other. The p-value indicates the significance of the difference between the two groups. A significant p-value indicates that there is a significant difference between the groups being compared (Norman, 2010).

Variables expressing preparation time are verbally expressed ordinal variables, frequencies were used to process them.

Gender differences in students' preparation time within the subjects studied (hypothesis 3) were tested using the Chi-square test used for categorical data. For tables larger than 2 x 2, the Chi-squared test can be used if at most 20% of the expected frequencies are less than 5 and none are less than 2. Our original data did not meet this assumption, so we merged the categories 3-4 hours; more than 4 hours into one: more than 3 hours.

To establish the correlation relationships between the variables in the case of testing hypotheses 5 - 7, a correlation matrix was constructed; the tables in the Results section show only part of it. The field inside the body of the table always contains the value of Pearson's correlation coefficient r, which is used for numerical signs; in the case of ordinal signs for students' preparation time for the course, Spearman's correlation coefficient rho was used (Jamieson, 2004; Norman, 2010). Statistical analysis was performed using SPSS software.

Null hypotheses tested at 5% significance level:

- **H_{0-1}:** Students' attitudes towards motivation in the case of economics and accounting do not differ by gender.
- **H_{0-2}:** Students' attitudes towards the teacher in the case of the economics and accounting course do not differ by gender.
- **H_{0-3}:** There are no gender differences in the time taken by students to prepare for the subjects of economics and accounting.
- **H_{0-4}:** There are no gender differences in students' school achievement in the subjects of economics and accounting.
- **H_{0-5}:** From a gender perspective, there is no correlation between preparation time and school success in the case of economics and accounting.
- **H_{0-6}:** School success in the subjects of economics, accounting, mathematics and mother tongue is not correlated in terms of gender.
- **H_{0-7}:** There is no correlation between students' attitudes towards motivation and school achievement in the case of economics and accounting in terms of gender.

For the purposes of the analysis, the abbreviations of the variables that appear in the explanations in the Results section:

- **F1 – F9:** motivation factors 1–9
- **C1 – C5:** competences describing the teacher's personality
- **ECO:** Economics
- **ACC:** Accounting
- **MAT:** Mathematics
- **MOT:** mother tongue (Czech and Slovak)
- **SA:** school achievement
- **TIME:** preparation time

RESULTS

Descriptive analysis of the examined variables

Gender differences were first identified using descriptive analysis methods. Differences were analysed in terms of factors that could motivate students in the learning process of economic subjects, in terms of students' evaluation of selected pedagogical competences of the teacher, in terms of school achievement in the subjects at the end of the second year of study and in terms of time spent per week on economics and accounting. The values were obtained using the average (Tables 1, 2, 3). Differences are shown by gender and subject.

Variable	Economics		Accounting	
	Boys (*n*=180)	Girls (*n*=392)	Boys (*n*=180)	Girls (*n*=392)
Attitudes towards motivation (from -2 to 2)				
F1	0.950	1.054	0.850	1.066
F2	0.250	0.268	0.239	0.217
F3	-0.850	-0.913	-0.856	-0.936
F4	1.072	1.122	0.928	1.036
F5	1.311	1.304	0.989	1.125
F6	-0.311	-0.217	-0.311	-0.079
F7	0.944	0.985	0.789	0.944
F8	1.217	1.311	1.178	1.247
F9	1.228	1.357	1.033	1.334
Teacher's evaluation (from -2 to 2)				
C1-Expertise	1.400	1.194	1.456	1.490
C2-Explanation	1.322	1.107	1.006	1.003
C3-Empathy	0.811	0.599	0.800	0.783
C4-Trust	0.944	0.890	0.994	0.949
C5-Motivator	0.894	0.702	0.717	0.819

Table 1: Descriptive statistics (ordinal variables), 2018

In economics and accounting, both boys and girls consider the following motivational factors to be the most important. These are the teacher's instructions on how to think (F7), accepting unusual ideas and analyzing mistakes (F8), and telling more than the facts (F9). None of the factors was rated negatively, i.e., as having a demotivating effect. Therefore, the factors can be considered important for increasing students' motivation in the subjects.

For the girls, the teacher's coherent way of speaking, their flexible reactions and readiness for the lesson are essential for

increasing motivation. This finding was identified at the level of both subjects. Boys perceive motivational factors differently. From their point of view, in the subject of economics, it is most important that the teacher uses practical examples, case studies with problem elements, so that they can propose a solution and discuss its correctness. In the subject of accounting, they find it most motivating when the teacher accepts their unusual ideas and can explain why a given suggestion can or cannot be put into practice, so they can learn from their own mistakes. Conversely, the least motivating factor, which creates negative attitudes in students, is explaining the curriculum using only the textbook (F3). This result appears to be true for both economics and accounting, and both boys and girls agree. Less significant, but also exclusively negative attitudes were identified in the situation when the teacher just assigns tasks and lets the students work independently (F6).

These results correspond with the student evaluation of selected pedagogical competences of teachers of economics and accounting. Both boys and girls assigned the highest values to the teacher's expertise and ability to explain the curriculum. Other competencies (empathy and confidence) averaged below 1 for both genders. A positive finding is that teacher's personality has a rather positive effect on students' motivation. Boys are more motivated to study economics by teacher's personality than girls. Conversely, to study accounting, the teacher motivates girls more than boys.

To better understand the relationship between motivation and school achievement, students' grades in economic subjects and the related subjects of mathematics and mother tongue were analysed. In terms of students' school achievement, differences were identified between boys and girls in all the subjects studied. At the end of the second year of study, on average, girls had better learning outcomes than boys (Table 2).

Variable	Boys (*n*=180)		Girls (*n*=392)	
	Mean	SD	Mean	SD
School Achievement (1-5)				
Economics	2.650	0.936	2.135	0.938
Accounting	2.611	1.038	2.097	1.027
Mathematics	2.900	1.025	2.454	1.053
Mother tongue	2.689	0.828	2.343	0.829

Table 2: Descriptive statistics (school achievement), 2018

The analysis of preparation time shows that the majority of boys and girls spend less than 1 hour or 1-2 hours per week preparing for both economics and accounting. Girls devote more time to preparation for both subjects (Table 3).

Variable	Economics		Accounting	
	Boys (*n*=180)	Girls (*n*=392)	Boys (*n*=180)	Girls (*n*=392)
Weekly preparation time				
I am not preparing at all (1)	18.89	12.50	18.33	5.10
Less than 1 hour (2)	40.00	31.63	40.56	37.76
1-2 hours (3)	30.56	30.87	27.22	32.14
3-4 hours (4)	9.44	20.41	11.11	19.90
More than 4 hours (5)	1.11	4.59	2.78	5.10

Table 3: Relative frequencies (weekly preparation time in %), 2018

Gender differences in the researched aspects in the subjects of economics and accounting (hypotheses 1-4)

Using Mann Whitney U test, statistical gender differences at the 5% level of significance were examined in respondents' attitudes towards motivational factors, teacher's personality and school achievement in the subjects of economics and accounting. Further, gender differences in weekly preparation time were also found using Chi-square test. Table 4 shows the results of the statistical tests.

Attitudes towards motivation

In the subject of economics, no statistically significant gender differences were found, i.e., boys and girls perceived the motivating or demotivating effect of the methods of teaching economics in the same way. In the subject of accounting, there are more statistically significant gender differences. Factor F1 (teacher emphasizes the applicability of the curriculum to real situations) is motivating for both boys and girls, but the intensity of motivation is perceived more by girls (Table 1). A significant difference was also found in the case of F6 (teacher sets a task, letting students work independently). For both boys and girls, this factor is demotivating, but more intensity was found for boys (Table 1). Another significant difference is found for factor F7 (teacher guides students to think critically), where again greater intensity of the motivating effect was found for girls compared to boys.

In all cases of significant gender differences, girls assigned higher positive values (i.e., greater intensity of motivation) or lower intensity of demotivation to motivational factors than boys. The researchers reject the hypothesis $H_{0\text{-}1}$ with 95% reliability for F1, F6, F7 and F9 for the subject of accounting.

Variable	Economics (*p*)	Accounting (*p*)
Attitudes towards motivation		
F1	0.107	0.008
F2	0.787	0.948
F3	0.615	0.482
F4	0.409	0.152
F5	0.754	0.115
F6	0.380	0.039
F7	0.321	0.019
F8	0.132	0.268
F9	0.073	0.003
Teacher's evaluation		
C1-Expertise	0.038	0.679
C2-Explanation	0.065	0.978
C3-Empathy	0.087	0.871
C4-Trust	0.501	0.671
C5-Motivator	0.239	0.363
Weekly preparation time	<0.001	<0.001
School achievement	<0.001	<0.001

Table 4: Mann Whitney U test and Chi-square test – significance of gender differences, 2018

Attitudes towards the personality of the teacher of economics and accounting

In the case of the subject of economics, a statistically significant gender difference in attitudes was found only for the teacher's expertise (Table 3). According to the average values reported in Table 1, boys perceive the economics teacher as a greater expert than girls. In the case of the subject of accounting, girls and boys rate the personality of the teacher equally – no significant gender differences were found for any of the five pedagogical competencies examined. However, for the subject of economics, the opposite result holds true. Girls assigned lower values to all teacher competencies than boys. The researchers reject hypothesis $H_{0\text{-}2}$ with 95% reliability in the case of the economics teachers' expertise.

Preparation time and school achievement in the subjects

Statistically significant differences were found in weekly preparation time for each subject, with girls spending more time studying the subject than boys (Table 3). A weak relationship was found between the variables. Cramer's V is 18% in the case of economics and 23.5% in the case of accounting. The researchers reject the hypothesis $H_{0\text{-}3}$ with 95% reliability in the case of both economics and accounting.

Significant gender differences were found in school achievement in both economics and accounting at the end of the second year of study. In both subjects, girls performed better than boys (Table 2). This result corresponds with the results shown in the students' attitudes towards motivational factors, whereby boys perceive the motivational intensity of factors at a lower level than girls and, therefore, may have a looser attitude towards their studies compared to girls. This may be related to their poorer grades and the lesser amount of time they devote to preparation for the subjects (Tables 2 and 3). The researchers reject hypothesis $H_{0\text{-}4}$ with 95% reliability in the case of economics and accounting.

Correlations between school achievement and weekly preparation time (hypotheses 5-6)

In order to better portray the relationship between preparation time and students' school achievement in economic subjects, a correlation analysis using Spearman's correlation coefficient *rho* was performed at the 5% significance level. The results are illustrated in the correlation matrix (Table 5).

Girls		SA2_ECO	SA2_ACC	Boys		SA2_ECO	SA2_ACC
Time_ECO	*rho*	0.006	0.090	Time_ECO	*rho*	0.015	0.045
	p	0.906	0.077		*p*	0.841	0.551
Time_ACC	*rho*	0.007	0.147	Time_ACC	*rho*	0.023	-0.018
	p	0.892	0.003		*p*	0.760	0.808

Table 5: Spearman's correlation coefficient for school achievement and weekly preparation time (hypothesis 5), 2018

The correlation analysis revealed a statistically significant association between school achievement and preparation time in the subject of accounting for girls ($p = 0.003$). For this group of variables, the dependency ratio (r) was found to be 0.147, i.e., a 15% direct dependence, indicating that girls with lower achievement spend more time on preparation for the subject of accounting. However, the correlation is weak. This result corresponds with the girls' attitude towards motivational factors in accounting. It has been shown that girls would be motivated by the teacher's ways of explanation that would help them understand the subject

matter. At the same time, girls rated accounting teachers better than economics teachers in terms of pedagogical competence. Other correlations between variables were not statistically significant. The researchers reject the hypothesis H_{0-5} at 95% significance level in the case of girls in the subject of accounting.

Furthermore, at the 5% significance level, Pearson's correlation coefficient r was used to determine the connections in school achievement between economics, accounting, mathematics, and mother tongue. The results are shown in the correlation matrix (Table 6).

	Girls				Boys		
	SA2_ECO	SA2_ACC	SA2_MAT		SA2_ECO	SA2_ACC	SA2_MAT
SA2_ACC	0.589	-	-	SA2_ACC	0.647	-	-
	<0.001	-	-		<0.001	-	-
SA2_MAT	0.505	0.591	-	SA2_MAT	0.638	0.620	-
	<0.001	<0.001	-		<0.001	<0.001	-
SA2_MOT	0.488	0.451	0.356	SA2_MOT	0.407	0.411	0.338
	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001

Table 6: Pearson's correlation coefficient for school achievement among subjects (hypothesis 6), 2018

Correlations were found for both boys and girls for all combination pairs of subjects ($p < 0.001$). The correlation of school achievement between subjects is stronger for boys than for girls. For girls, the strongest correlation is between grades in accounting and mathematics ($r = 0.591$) and grades in accounting and economics ($r = 0.589$). Significant gender differences and higher intensity of motivation were found for girls for factors that led to an understanding of the curriculum due to the teacher's helpful explanation. In accounting, cognitive operations are based on mathematical laws and the theory of logic. This may explain the less strong degree of dependence of performance between these subjects. For boys, the strongest correlations were found between grades in accounting and economics ($r = 0.647$), grades in economics and mathematics ($r = 0.638$), and grades in accounting and mathematics ($r = 0.620$). The correlations are weaker for both girls and boys when taking the mother tongue into account, which is consistent with the fact that, cognitively, economic subjects are more similar to mathematics. Hypothesis H_{0-6} is rejected at 95% reliability for both boys and girls for all pairs of subjects.

Correlation between attitudes towards motivational factors and school achievement in economics and accounting (hypothesis 7)

Pearson's correlation coefficient r was used to determine, at the 5% significance level, how educational achievement at the end of the second year of study in the subjects of economics and accounting is related to boys' and girls' attitudes towards motivation in these subjects (Tables 7 and 8).

		F1	F2	F3	F4	F5	F6	F7	F8	F9
SA2_ECO Boys	*r*	-0.028	-0.149	-0.150	-0.106	-0.220	-0.084	-0.088	-0.071	0.015
	p	0.714	0.045	0.045	0.155	0.003	0.262	0.242	0.346	0.841
SA2_ECO Girls	*r*	-0.108	0.101	0.100	-0.039	-0.165	-0.045	-0.175	-0.133	-0.147
	p	0.033	0.046	0.047	0.440	0.001	0.375	<0.001	0.008	0.004

Table 7: Pearson's correlation coefficient for attitudes towards motivational factors and school achievement in economics (hypothesis 7), 2018

The correlation between learning outcomes and students' perceptions of motivational factors in the subject of economics shows a predominantly negative relationship for significant correlations (Table 7). This means that, to a greater extent, students with better school results (i.e., lower grades) assigned higher values to the motivational factors to express the intensity of the motivational effect. Gender differences are evident in the case of economics, as girls have more significant correlations between variables than boys, or they differ in direct or indirect dependence. It should be noted that the strength of the positive or negative dependence between the variables is weak.

In the case of boys, a negative correlation between school achievement and factors F2, F3, and F5 was found at the 5% significance level. This means that boys with better grades have a positive attitude towards motivation when the teacher explains the basic curriculum without deeper understanding, which can result in a good grade. Such a tendency was also shown in the case where the teacher only explained the textbook curriculum and in the case where he used practical examples and the student had to suggest solutions to problems. The strongest correlation was found for F5 ($r = -0.220$).

In the case of girls, both positive and negative relationships between school achievement and perceived motivational factors in the subject of economics were found at the 5% significance level. A negative relationship was found between school achievement and the following factors: F1, F5, F7-F9. This means that girls with better achievement have a positive attitude towards motivation in cases where the teacher presents the curriculum in a way that the student understands the relevance to real-life situations, uses real-life examples, where the student suggests solutions to problems, where the teacher discusses mistakes with the students, where the teacher communicates more than facts and leads the students to think critically. A positive relationship was shown between learning outcomes and factors F2 and F3. That is, girls with poorer school results (i.e., higher grades)

have a positive attitude towards motivation when the teacher explains the basic curriculum without deeper understanding using the textbook, which can result in a good grade.

A major gender difference was identified in the subject of economics, where factors F2 and F3 are motivating for girls with poorer school results and, on the contrary, for boys with better results.

		F1	F2	F3	F4	F5	F6	F7	F8	F9
SA2_ACC	*r*	-0.317	-0.103	-0.122	-0.233	-0.212	-0.217	-0.196	-0.212	-0.177
Boys	*p*	<0.001	0.167	0.102	0.002	0.004	0.003	0.009	0.004	0.018
SA2_ACC	*r*	-0.281	0.080	0.101	-0.152	-0.232	-0.109	-0.171	-0.272	-0.195
Girls	*p*	<0.001	0.112	0.045	0.003	<0.001	0.030	<0.001	<0.001	<0.001

Table 8: Pearson's correlation coefficient for attitudes towards motivational factors and school achievement in accounting (hypothesis 7), 2018

Gender differences in the subject of accounting are to a lesser extent than in the subject of economics. The correlation between learning outcomes and students' perception of motivational factors again shows a negative relationship between the variables except for factor F3 in the case of girls. The degree of dependence of the variables is relatively weak.

In the case of boys, a negative correlation between school achievement and factors F1, F4-F9 was found at the 5% significance level. This means that boys with better grades have a positive attitude towards motivation when the teacher explains the practicality of the curriculum and uses simple examples but gives space for questions and discussion, uses practical examples; when the student has to suggest solutions to problems, when he/she discusses mistakes with students, when he/she communicates more than facts and leads students to think critically. On the other hand, this relationship also applies to the case where the teacher only assigns individual work tasks.

In the case of girls, a negative correlation between school achievement and the perception of the same motivational factors as boys was found at the 5% level of significance. The level of the dependent variables is higher for boys. Positive dependence between the variables was found in the case of F3 for girls. This means that positive attitudes towards motivation in the case where the teacher only assigns individual work tasks are more likely for girls with poorer grades. The main gender difference in this tendency was found in the subject of accounting (similar to the subject of economics).

The researchers reject the hypothesis $H_{0\text{-}7}$ at 95% reliability for both girls and boys for both subjects.

DISCUSSION

The study examined gender differences in school achievement and attitudes of secondary school students towards motivation in economic subjects. For the actual analysis, 572 valid questionnaires were used. To understand the context better, the variables were supplemented with additional data on attitudes towards the teacher of the subject, on the time students spend studying economic subjects, and on learning outcomes in mathematics and mother tongue, which are essential for the development of economic thinking and understanding of information (OECD, 2014; Wiliam, 2011; Watts and Zimmerman, 1978). The study based its research approach on several similar studies that have described significant gender differences not only in attitudes towards motivation and school achievement, but also examined attitudes towards teacher's personality and correlations between variables (Alharbi et al., 2020; Berková et al., 2018; Perelygina et al., 2020). The researchers reject the null hypotheses 3, 4, 6, and 7. The researchers reject the null hypotheses 1 and 5 for the subject of accounting. They reject the null hypothesis 2 in the case of the economics teacher's expertise.

Gender differences in school achievement in economic subjects

Significant gender differences were found in school achievement in both economics and accounting. The results showed that girls perform better than boys in both subjects i.e., a similar relation exists in the economic subjects as has been shown in other educational domains (Deary et al., 2007; Voyer and Voyer, 2014; Eriksson et al., 2020; Coetzee et al., 2020). The results are consistent with the research of Pintrich and de Groot (1990), which points to several important factors influencing learning outcomes. These include self-discipline, which is also confirmed by Duckworth and Seligman (2006), noting that girls perform better on average in these behavioral skills. Other factors are confidence in one's own performance and fear of exams (Erdem-Keklik and Keklik, 2014), which is higher for girls than for boys (Chmelárová et al., 2018). These factors seem to be reflected in the result of this study, which showed significant differences in the amount of preparation time i.e., that girls spend more time per week studying both subjects compared to boys. The reasons for these findings can also be supported by other research. Boys, compared to girls, are more likely to express aggressive behavior and display more developmental difficulties and negative attitudes towards learning (Lansford et al., 2012), suggesting that girls generally adapt more easily to the school environment and have stronger social responsibility (Giota and Bergh, 2021).

There was a direct relationship between school achievement and preparation time in the case of accounting, $r = 0.147$ (girls with lower achievement spend more time on the preparation for accounting). This finding may shed a different light on the assumption made in the previous paragraph, where girls' more responsible approach to their studies was associated with their better performance compared to boys. Anyway, for boys, these relationships were not found at all in accounting, and in the case of economics, the link between school achievement and preparation time was not found for either girls or boys. A different result in accounting can be illustrated by the study of Fields et al. (2001), which discusses the theory of accounting and the approaches underlying the discipline and relies more on the theory of logic. The existence of significant gender

differences in subjects aimed at developing abstract-visual thinking is also supported by Eriksson et al. (2020). This may be the reason why a significant correlation was found in the case of girls with poorer grades in that subject. The above relationships were further explored through correlation analysis of school achievement between economic subjects, mathematics, and mother tongue. This idea is based on the results of PISA (OECD 2010), which showed a relationship between numeracy and financial literacy. Furthermore, the idea is supported by research verifying the relationships between language skills (especially reading comprehension) and the development of critical thinking (Wiliam, 2011), which is important for studying economics. This study found correlations in the case of school achievement between accounting, economics, mathematics, and mother tongue. Girls perform better than boys in all the subjects studied, which is consistent with the study of Marmeleira et al. (2020) in the case of Mathematics and Foreign Language.

Gender differences in attitudes towards motivation in economic subjects

Significant gender differences were found in attitudes towards motivation in both subjects. Girls attributed a higher intensity of motivation (or a lower intensity of demotivation) to the factors assessed than boys. In the case of accounting, the significant factors that elicited a greater motivational effect for girls than boys included several modes of explanation – the applicability of the curriculum to everyday situations, if the teacher guides students to think critically about the topic and understand the content, if the teacher communicates more than facts. In this last factor, the same significant gender difference was also found in the case of economics. The results of this study are in line with relatively recent research (Bru et al., 2021) that has shown that the choice of teaching methods and resources has an impact on increasing girl's activity and engagement in the classroom. Specifically, it supports and assists in a better understanding of the curriculum. What really motivates girls in accounting is the teacher's supportive approach. For boys, activity in the classroom can be increased by a clearer structure of learning activities. Significant gender differences in attitudes towards motivation in accounting were also found when the teacher let students work independently and only corrected inconsistencies. Such a process was demotivating for both girls and boys, but boys perceived it more negatively. The results are consistent with evidence of the impact of activating teaching methods on attitudes towards motivation (Lebid and Shevchenko, 2020).

Significant differences were also found between girls and boys in their perception of the teacher's personality, which was defined in this research by five pedagogical competencies – expertise, clear explanation, empathy, trust, and ability to motivate. A statistically significant gender difference was found in the case of the expertise of the teacher of economic subjects, with boys rating the teacher as more expert than girls. These differences can again be explained by the nature of the two subjects and the approaches underlying both disciplines (Watts and Zimmerman, 1978). Girls may perceive the subject as more difficult and may have more respect for it, which was reflected in their ratings of the teacher's expertise and also in their attitudes towards motivational factors. The personality of the teacher plays an important role in the teaching process. Also, the motivation of the students to study the subject depends on the motivation of the teacher to perform the profession (Perelygina et al., 2020).

A number of studies have found that school achievement and motivation are related, with the teacher and the way they prepare students for professional life being significant factors (Chetty et al., 2014; Rivkin et al., 2005; Rockoff, 2004; Fung et al., 2017). This study found that students' school achievement in economic subjects is significantly related to their attitudes towards motivation and also to their learning outcomes in cognitively related subjects such as mathematics and their mother tongue. Boys and girls with better performance are motivated by the teacher's approaches that keep students' attention during the lesson and lead to a deeper understanding of the curriculum and its relevance to real-life situations. This tendency was found in the subjects of economics and accounting. Another interesting tendency is shown in both subjects, which was demonstrated only in the case of girls with poorer grades. This group has a positive attitude towards motivation in the cases where the teacher explains the basic curriculum using the textbook, which can result in a good grade. In accounting lessons, this group is also motivated by individual work.

CONCLUSION

The study highlighted the importance of studying the relationship between school achievement and students' attitudes towards motivation in secondary economic education in the context of gender. The limitation of this research is mainly in its focus on students' attitudes, i.e., their perceptions of motivation factors in studying economic subjects. The selected motivation factors focused on the attractiveness of the teacher's delivery of the lesson and the ways of holding students' attention. Thus, the examined motivation factors did not include all the attributes of motivation. The research also focused on students' attitudes towards the teachers of economics and accounting. Again, it was about students' perception, and some teacher competences were selected. The focus was on expertise, clear explanations, empathy, trust, and the ability to motivate. In this context, the research was not exhaustive, and leaves space for exploring other pedagogical, psychological and didactic aspects related to the links between student motivation, teacher's personality and school achievement. It would also be interesting to examine school achievement in terms of students' intellectual level and real abilities, which also determine it greatly. Achievement expressed in terms of summative assessment (grade) also does not guarantee a complex assessment of school performance, but is only one of its possible indicators.

The research results in this study broaden the theoretical assumptions about students' school achievement in the context of gender in the area of secondary school economic education. In line with the OECD study (2009), this type of research can help teachers of economics and accounting to improve their student performance. The study discovered several aspects that teachers can use in their teaching practice to differentiate

their approaches to students as well as their choice of teaching and learning methods according to students' gender, thus motivating them better to become active learners of economics and accounting, which should consequently lead to better school achievement of boys and girls in these subjects. Besides these practical implications, the study also contributes to the theoretical understanding of gender differences and their impact on relations between the approaches and teaching and learning methods that teachers prefer and their students' school achievement (e.g., Bru et al., 2021; Lebid and Shevchenko, 2020) by implying how methods of teaching and learning can be better adjusted to boys' and girls' learning styles and how teachers' behavior in class in suitably differentiated ways can also help to motivate girls and boys better.

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APPENDIX

Motivational factors (Economics)

	If item dropped Cronbach's α
F1_ECO	0.477
F2_ECO	0.553
F3_ECO	0.580
F4_ECO	0.454
F5_ECO	0.453
F6_ECO	0.521
F7_ECO	0.443
F8_ECO	0.460
F9_ECO	0.480

Motivational factors (Accounting)

	If item dropped Cronbach's α
F1_ACC	0.568
F2_ACC	0.646
F3_ACC	0.675
F4_ACC	0.568
F5_ACC	0.568
F6_ACC	0.644
F7_ACC	0.564
F8_ACC	0.579
F9_ACC	0.582

Teacher competences (Economics)

	If item dropped Cronbach's α
C1_ECO	0.821
C2_ECO	0.798
C3_ECO	0.799
C4_ECO	0.819
C5_ECO	0.817

Teacher competences (Accounting)

	If item dropped Cronbach's α
C1_ACC	0.853
C2_ACC	0.838
C3_ACC	0.830
C4_ACC	0.838
C5_ACC	0.838

Preparation time for the subject

	If item dropped Cronbach's α
T_ECO	0.638
T_ACC	0.587
T_MAT	0.701
T_MOT	0.674

School success rate in the subjects

	If item dropped Cronbach's α
SA2_ECO	0.745
SA2_ACC	0.735
SA2_MAT	0.774
SA2_MOT	0.820