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JOZEF PAVELKA

Pupils' Decisions to Pursue Technical Education

Professor, University of Prešov in Prešov, Faculty of Humanities and Natural Sciences, Department of Physics, Mathematics and Technologies, Slovak republic

Abstract

The study presents selected results of empirical research conducted in 2019 in primary schools in Slovakia and the Czech Republic. The main goal of the research was to investigate the causes of interest/lack of interest of pupils in science, technology and studying technical subjects at secondary vocational schools. Pupils' decisions about future studies and the influences acting on pupils in this regard are important factors that are closely related to pupils' interest/lack of interest in science, technology and the study of technology.

Keywords: interest in technology, study of technology, primary school, research

Introduction

The issue of examining the causes and impacts influencing pupils' interest/lack of interest in science, technology and the study of technology was studied by the team led by prof. PaedDr. J. Pavelka, CSc. from FHPV PU in Prešov (PaedDr. J. Šoltés, PhD., FHPV PU in Prešov, prof. PaedDr. M. Ďuriš, CSc. from FPV UMB in B. Bystrica, doc. PaedDr. V. Tomková, PhD. from PF UKF in Nitra and prof. PaedDr J. Honzíková, PhD. The main goal of the research was to determine factors which influence the pupils' interest/lack of interest in particular subjects in their decision-making regarding their further studies at secondary schools and to identify the current state and possible causes (phenomena) that affect pupils' interest in science, technology and technical education. The subjects of the research conducted in the period from 10 January 2019 to 25 February 2019 were pupils attending the 8th and 9th grade of elementary schools. The research sample consisted of 2,199 respondents from the regions of the Slovak Republic and 577 respondents from the Czech Republic. The main research method employed was the questionnaire method. The custom-designed

questionnaire consisted of 23 items. The results of the research were published in a scientific monograph entitled *The Interest of Primary School Pupils In Technical Activities And Technical Education* from 2020, which is available at: http://www.pulib.sk/web/kniznica/elpub/dokument/Pavelka7.

We also informed the public about the selected research results in a study entitled *Why Are Primary School Pupils Not Interested In Science, Technology And The Study of Technology*? (available at: http://www.fpv.umb.sk/katedry/katedra-techniky-a-technologii/casopis-technika-a-vzdelavanie.html). The following study presents only selected research results regarding the choice of future studies and the influences that influence the choice of secondary school.

Results of Empirical Research, Discussion

Deciding on further studies is one of the most important decisions every person will ever make. Pupils in the 8th and especially the 9th grade of elementary school are expected to make this decision by February of the school year, and report it to the schools of their choice. Traditionally, most pupils choose grammar schools. Item 9 of the questionnaire examined the specialization of secondary schools at which respondents applied (Table 1).

Item 9. ***Have you already been thinking about choosing secondary school?*** *Rank the schools from the list from 1 to 3 according to your preference.*

The results in Table 1 show that the pupils are most interested in grammar schools as 21.46% of Slovak pupils and 12.65% of Czech pupils picked a grammar school as their priority, followed by specialized schools (9,64%; in the Czech Republic 14.38%) and electrical engineering (8.64%; in the Czech Republic 10.05%).

Table 1. Replies of respondents from the Slovak Republic to Item 9 ranked according to the order and specialization of the secondary school

Rank of the school	As 1st choice	%	As 2nd choice	%	As 3rd choice	%	In total	%
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
a) grammar school	472	21.46	153	6.96	155	7.05	780	11.82
b) healthcare	167	7.59	200	9.10	119	5.41	486	7.37
c) arts	147	6.68	163	7.41	113	5.14	423	6.41
d) conservatory	52	2.36	63	2.86	71	3.23	186	2.82
e) woodworking	36	1.64	31	1.41	41	1.86	108	1.64
f) economics	98	4.46	156	7.09	128	5.82	382	5.79
g) food industry	16	0.73	27	1.23	33	1.50	76	1.15
h) construction	66	3.00	66	3.00	54	2.46	186	2.82
i) sport	156	7.09	197	8.96	173	7.87	526	7.97
j) engineering	95	4.32	91	4.14	80	3.64	266	4.03
k) IT	162	7.37	150	6.82	115	5.23	427	6.47
l) fashion	5	0.23	25	1.14	41	1.86	71	1.08
m) agriculture	24	1.09	35	1.59	28	1.27	87	1.32

1	2	3	4	5	6	7	8	9
n) trade	48	2.18	99	4.50	139	6.32	286	4.34
o) electrical engine-ering	190	8.64	181	8.23	129	5.87	500	7.58
p) transport	47	2.14	64	2.91	54	2.46	165	2.50
r) other	212	9.64	147	6.68	235	10.69	594	9.00
s) hospitality	95	4.32	98	4.46	95	4.32	288	4.37
Did not reply	111	5.05	253	11.51	396	18.01	760	11.52
In total	2199	100	2199	100	2199	100	6597	100

In total, respondents are interested in studying grammar school (11.82%; in the Czech Republic 8.84%), other specializations (9.00%; in the Czech Republic 9.47%) and sports (7.97%; in the Czech Republic healthcare 8.03% and sport 7.86%). Other specializations include electrical engineering (7.58%; in the Czech Republic 7.63%), health care (in the Slovak Republic 7.37%), in the Czech Republic economics (6.59%), information technologies (6.47%; in the Czech Republic 5.43%), arts (6.41%; 4.85%), etc. The lowest interest of respondents from the Slovak Republic was found in the case of the study programmes specializing in fashion (0.23%), food (0.73%) and agriculture (1.09%), in the Czech Republic it was hospitality (0.00%) and fashion (1.33%). Interest in studying other specializations ranges from 4.46% to 1.64%; in the Czech Republic from 4.85% to 1.68%. More girls (13.82%; in the Czech Republic 7.97%) than boys (7.64%; in the Czech Republic 4.68%) are interested in studying at grammar schools (Table 2). Eight graders (10.46%; in the Czech Republic 5.72%) and ninth graders (11.01%; in the Czech Republic 6.93%) are interested in studying at grammar schools to the same extent.

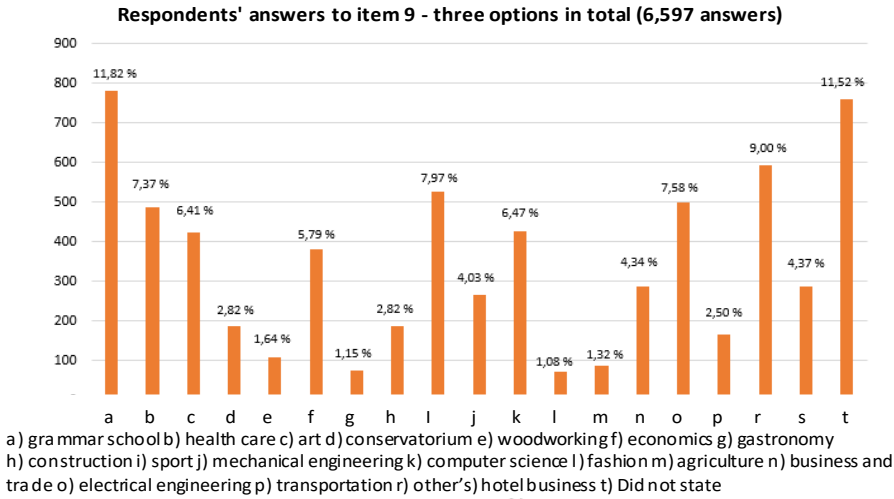
Table 2. Replies of respondents from the Slovak Republic to Item 9 by gender and grade

Replies – 1st choice	D	%	CH	%	8th grade	%	9th grade	%	In total	%
1	2	3	4	5	6	7	8	9	10	11
a) grammar school	304	13,82	168	7,64	230	10,46	242	11,01	472	21,46
b) healthcare	133	6,05	34	1,55	84	3,82	83	3,77	167	7,59
c) arts	111	5,05	36	1,64	84	3,82	63	2,86	147	6,68
d) conservatory	37	1,68	15	0,68	34	1,55	18	0,82	52	2,36
e) woodworking	6	0,27	30	1,36	19	0,86	17	0,77	36	1,64
f) economics	73	3,32	25	1,14	45	2,05	53	2,41	98	4,46
g) food industry	11	0,50	5	0,23	8	0,36	8	0,36	16	0,73
h) construction	8	0,36	58	2,64	29	1,32	37	1,68	66	3,00
i) sport	48	2,18	108	4,91	91	4,14	65	2,96	156	7,09
j) engineering	1	0,05	94	4,27	39	1,77	56	2,55	95	4,32
k) IT	15	0,68	147	6,68	87	3,96	75	3,41	162	7,37
l) fashion	4	0,18	1	0,05	3	0,14	2	0,09	5	0,23
m) agriculture	10	0,45	14	0,64	11	0,50	13	0,59	24	1,09
n) trade	31	1,41	17	0,77	24	1,09	24	1,09	48	2,18
o) electrical engine-ering	3	0,14	187	8,50	82	3,73	108	4,91	190	8,64

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
p) transport	12	0,55	35	1,59	27	1,23	20	0,91	47	2,14
r) other	150	6,82	62	2,82	129	5,87	83	3,77	212	9,64
s) hospitality	50	2,27	45	2,05	49	2,23	46	2,09	95	4,32
Did not reply	74	3,37	37	1,68	73	3,32	38	1,73	111	5,05
In total	1081	49,16	1118	50,84	1148	52,21	1051	47,79	2199	100

Under item 9, 2,199 respondents from the Slovak Republic could assign numbers 1 to 3 to different fields of interest to create the order of those schools that they think would be the most suitable for them. The results show (Graph 1) that 11.82% of respondents chose a grammar school as their option no.1, 9.00% of respondents chose as their no. 2 a school with different fields of study than those presented to them and approximately the same number of pupils choose between 3 types of schools – 7.97% chose sports, 7.58% chose electrical engineering and 7.37% chose health care. Other schools not specializing in technology of any kind attracted between 6.47% to 4.37% of pupils with the exception of mechanical engineering schools (4.03%). Other schools specializing in technology attracted less than 2.82% of pupils.

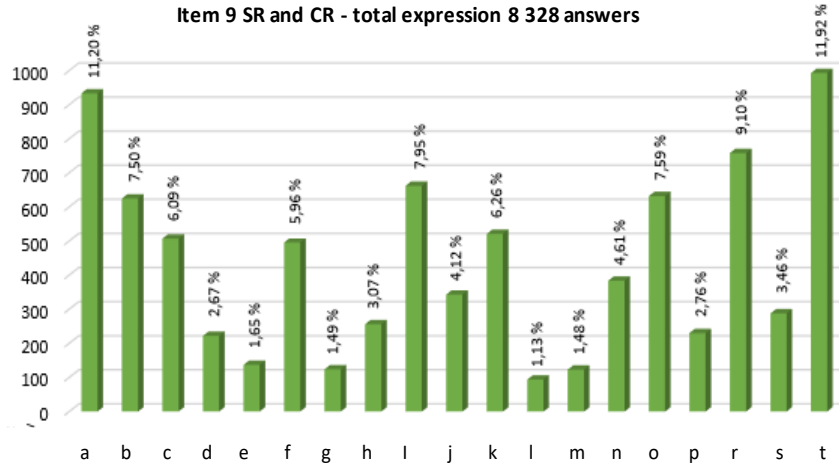
When comparing the research results in Item 9 for the Slovak Republic and the Czech Republic, Graph 2 shows that the overall results for both countries are almost identical.



Graph 1. Have you already been thinking about choosing secondary school? Rank the school from the list from 1 to 3 according to your preference

Based on the results, we can state that grammar schools (21.46%; in the Czech Republic 12.65%) attracted the highest number of pupils, thus confirming

the long-term interest of students in studying at grammar schools, at schools with different specialization (9.64%; in the Czech Republic 14, 38%) and schools specializing in electrical engineering (8.64%; in the Czech Republic 10.05%). Pupils have a low to very low interest in studying at secondary schools specializing in technology. This confirms that the trend – lack of interest of students from the Slovak Republic and the Czech Republic in studying technology – still continues, the study of technology is unattractive for students and is one of the reasons for the lack of technically-skilled people on the labor market in the Slovak Republic.



a) grammar school b) health care c) art d) conservatorium e) woodworking f) economics g) gastronomy h) construction i) sport j) mechanical engineering k) computer science l) fashion m) agriculture n) business and trade o) electrical engineering p) transportation r) other's) hotel business t) Did not state

Graph 2. Item 9 – overview of all replies of respondents from Slovakia and the Czech Republic

The main reasons that lead students to choose grammar schools and secondary schools not specializing in technology is the lack of activities and influences that would target and develop the needs and motivate students to learn about science and technology. Such activities and influences include:

– activities organized by the state, institutions and schools, including mass media fail to popularize science and technology,

– low level of awareness of importance of science and technology and interest of pupils and their parents in relation to dual education,

– insufficiently developed needs and motivations of students with regard to formal and informal knowledge and study of science and technology caused in many cases by the poor state of learning premises and material allocated to tech-

nology lessons along with poor preparation of teachers at primary schools in the Slovak Republic.

Under Item 9, respondents were asked to provide a justification for the choice of schools at which they want to study. From a qualitative point of view (we do not present the results due to their large-scale nature), the vast majority of respondents from both the Slovak Republic and the Czech Republic stated the following: *I am interested in, I enjoy it, I would like to become, I want to be, I want to go, I would like to be, etc.,* which really points to the uncertainty of pupils rather than a strong belief. The replies of respondents from the Slovak Republic show a qualitatively higher level of justification, for example *I like it – I like working with (1.64%), I am planning to study at a university (3.41%), I am not interested in studying the field (0.45%), I can relate to that (0.14%), I have always been interested in – this suits me the most (0.18%) and I think this suits me the most (0.45%).* The reply *I don't know what I want to do, where I want to study, I still have time to decide,* was chosen by 1.73% of respondents. The reason was not stated by 67.26% of respondents from the Slovak Republic.

From a qualitative point of view, we state that a high rate of failure to state a reason (1,479 pupils out of 2,199) and the lack of confidence in one's reply and reasoning of the respondents to the choice of the secondary school confirm pupils are uncertain and hesitant when choosing their further studies. This fact seriously impacts pupils when deciding whether or not to study at secondary schools specializing in technology.

Item 10 was included in the questionnaire in order to examine the reasons that influence pupils when deciding on their future studies in more depth.

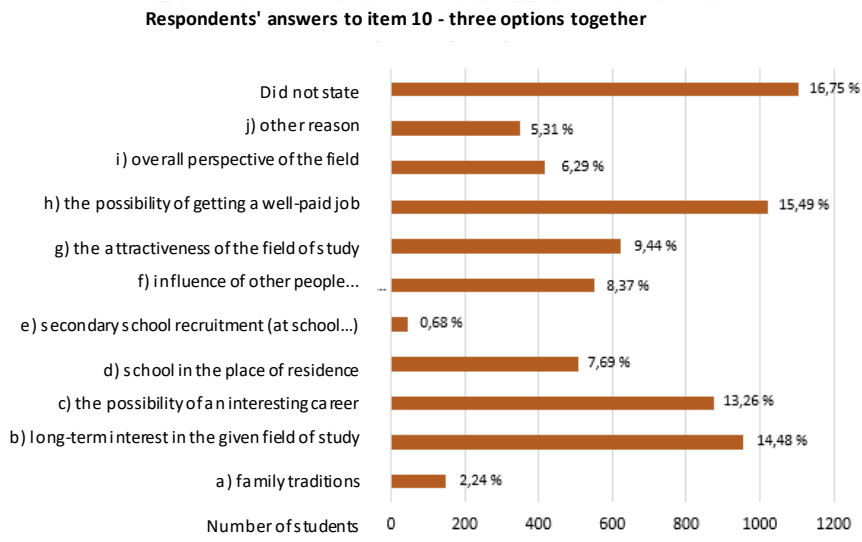
Item 10. Try to choose the 3 most important reasons that influence you when choosing a secondary school. Choose max. 3 options!

The results regarding Item 10 (Table 3) show that 42.16% (in the Czech Republic 42.63%) of respondents chose as a reason long-term interest in the field of study, 22.78% (in the Czech Republic 22.88%) the possibility of interesting career and 10.00% (10.05% in the Czech Republic) availability of the school in the place of residence. Other significant reasons include family traditions (6.68%; in the Czech Republic 7.80%) and the influence of the surroundings (5.50%; in the Czech Republic 7.28%). The reasons with the lowest level of representation include the overall perspective of the field – employment (0.41%; in the Czech Republic 0.52%) and recruitment process of a secondary school (0.91%; in the Czech Republic 0.69%). 3.59% (2.77% in the Czech Republic) of respondents chose the "other reason" option.

Table 3. Replies of respondents from the Slovak Republic to Item 10 in order (3 options) and according to the gender

3 most important reasons	As 1st choice	%	As 2nd choice	%	As 3rd choice.	%	In total	%	G	%	B	%
a) family traditions	147	6,68	0	0,00	1	0,05	148	2,24	59	2,68	88	4,00
b) long-term interest in the given field of study	927	42,16	28	1,27	0	0,00	955	14,48	492	22,37	435	19,78
c) the possibility of an interesting career	501	22,78	369	16,78	5	0,23	875	13,26	211	9,60	290	13,19
d) the availability of the school in and around the place of residence	220	10,00	256	11,64	31	1,41	507	7,69	99	4,50	121	5,50
e) recruitment process of secondary school (at school, in the media)	20	0,91	18	0,82	7	0,32	45	0,68	9	0,41	11	0,50
f) the influence of the environment (recommendation of someone – parents, teachers ...)	121	5,50	343	15,60	88	4,00	552	8,37	71	3,23	50	2,27
g) attractiveness of the field of study	69	3,14	381	17,33	173	7,87	623	9,44	38	1,73	31	1,41
h) the prospect of a well-paid job	58	2,64	354	16,10	610	27,74	1022	15,49	19	0,86	39	1,77
i) overall perspective of the field of study (future employment)	9	0,41	48	2,18	358	16,28	415	6,29	4	0,18	5	0,23
j) another reason	79	3,59	57	2,59	214	9,73	350	5,31	35	1,59	44	2,00
Did not state	48	2,18	345	15,69	712	32,38	1105	16,75	33	1,50	15	0,68
In total	2199	100	2199	100	2199	100	6597	100	1070	48,66	1129	51,34

When we take into account all 3 choices of the respondents together, we get the results presented in Graph 3. From the Graph 3 it is clear that the highest number of respondents choose the secondary school with the prospect of future employment in mind (15.49%), closely followed by the long-term interest in the given field of study (14.48%) and the possibility of an interesting career (13.26%). The choice of other options from the offer of the item ranges from 9.44% to 0.68%.



Graph 3. Choose the 3 most important reasons that influence you when choosing a secondary school you would like to study at

Based on the results arrived at under Item 10, we state that one of the most important reasons which influence pupils when deciding on the secondary school is their own, long-term interest in the field of study, the possibility of an interesting career and the availability of the school. It is very encouraging that pupils pursue their interests, however, the question remains whether the respondents assess their own qualities when choosing the secondary school. Although the possibility of an interesting career is a strong motivating factor, it may be influenced by what is currently "in" and "fashionable" in a given period. The availability of the school in the place of residence is a "strong" factor, which unfortunately often limits and significantly influences the possibility of choosing a suitable field of study. The results obtained from the Slovak Republic and the Czech Republic are comparable.

There is one finding which should not be overlooked – "opportunity to get a well-paid job" was chosen by 15.49% as their 1st choice, thus placing this option ahead of the reason "long-term interest in the field of study".

The aim of Item 15 was to examine what factors in the pupils' surroundings are the most influential when deciding on the secondary school. Respondents could assign number 1 to 3 to different options, thus ranking them according to their own taste. The results are shown in Table 4.

Item 15. Which person from your surroundings has the biggest influence on you when deciding on secondary school? *Rank the person from the list from 1 to 3 according to their influence. 1 means the biggest influence.*

The results show that parents are the most important influence acting on pupils when choosing a secondary school – overall as well as the first choice (62.35% / 25.81%; in the Czech Republic 64.47 / 25.19%), followed by classmates – friends – overall (12.29%; in the Czech Republic 12.82%) and family members sister/brother (9.11%; in the Czech Republic 7.11%), or grandmother – grandfather (7.81%; in the Czech Republic 9.71%). Teachers (3.91%; in the Czech Republic 5.49%) and educational counselors of schools (2.15%; in the Czech Republic 0.92%) occupy the lowest positions. However, the pupils who do not let other people influence them and those who made the decision themselves dominate the results – overall ranking (16.42%) as well as the first choice 8.14% (in the Czech Republic 5.55%). 5.05% (7.63% in the Czech Republic) of pupils in the overall results category and 20.21% (20.10% in the Czech Republic) of pupils in the category of the 1st option did not give an answer to the question.

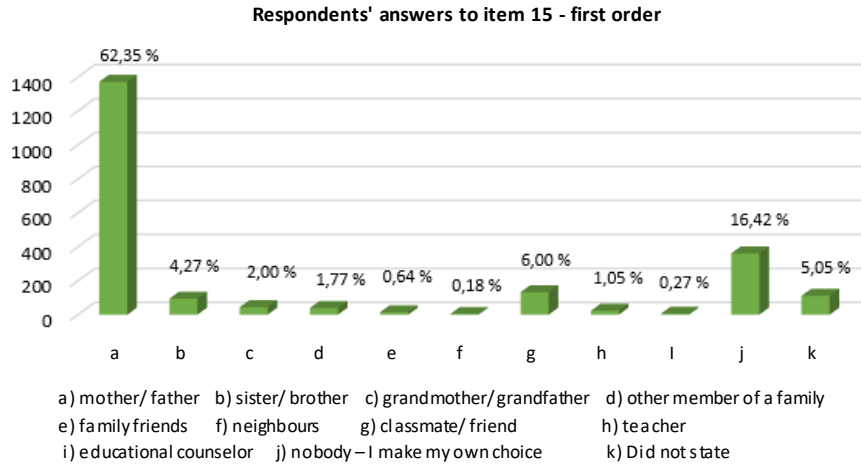
Table 4. Replies of respondents from the Slovak Republic to Item 15 in order (3 options)

The biggest influence...	As 1st choice	%	As 2nd choice	%	As 3rd choice	%	No. of replies in total	%
a) mother/ father	1371	62,35	271	12,32	61	2,77	1703	25,81
b) sister/ brother	94	4,27	375	17,05	132	6,00	601	9,11
c) grandmother/ grandfather	44	2,00	271	12,32	200	9,10	515	7,81
d) other family member	39	1,77	118	5,37	175	7,96	332	5,03
e) family acquaintances	14	0,64	124	5,64	199	9,05	337	5,11
f) neighbours	4	0,18	6	0,27	18	0,82	28	0,42
g) classmate/friend	132	6,00	340	15,46	339	15,42	811	12,29
h) teacher	23	1,05	71	3,23	164	7,46	258	3,91
i) educational counselor	6	0,27	38	1,73	98	4,46	142	2,15
j) nobody – I make the decision by myself	361	16,42	63	2,86	113	5,14	537	8,14
Did not respond	111	5,05	522	23,74	700	31,83	1333	20,21
In total	2199	100	2199	100	2199	100	6597	100

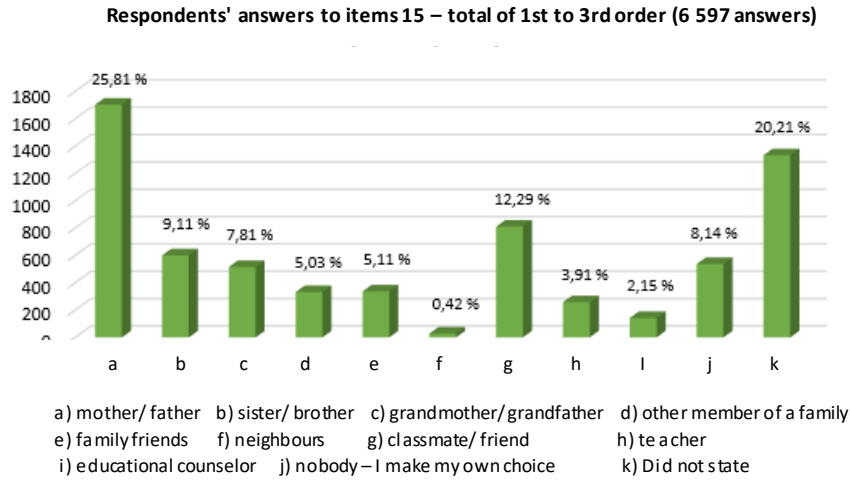
With regard to the 1st choice replies given under Item 15 (as presented in the Graph 4), it can be stated that parents (62.35%) have the greatest influence on the respondents when deciding on the secondary school, 16.42% of respondents stated no person influences them in their choice – they decide for themselves, 6.00% stated they are influenced by classmates / friends. The influence of other persons is below 4.27 %. The influence of the teacher (1.05%) and the school's educational counselor (0.27%) shows equally negligible values.

The results obtained under Item 15 change (quantitatively and qualitatively) when we evaluate them with regard to the overall replies (6,597 replies) – Graph 5. The parents still remain the top choice – 25.81%, followed in the se-

cond place by classmates / friends (12.29%). From the originally second place the option *"I decide for myself"* (8.18%) fell down to the third place. Family members also proved to be an important factor, rising from 5.03% to 9.11%.



Graph 4. Which person has the greatest influence on you when choosing a secondary school? – 1st choice



Graph 5. Which person influences you the most when choosing the secondary school? – 1st to 3rd choice

A gender analysis of Item 15 shows similar results – parents are the most influential figures for girls (30.20%; in the Czech Republic 32.24%) and boys (32.15%; in the Czech Republic 32.24%), followed by classmates – friends (girls

2.77%, in the Czech Republic 2.77%; boys 3.23%, in the Czech Republic 2.08%). Values concerning the influence of teachers (girls 0.59%, in the Czech Republic 0.17%; boys 0.45%, in the Czech Republic 0.17%) and educational counselors at schools (girls 0.05%, in In the Czech Republic 0.00%, boys 0.23%, in the Czech Republic 0.00%) are very low. Approximately 8% of girls and boys in the Slovak Republic and 7% in the Czech Republic make their own decision in this regard. Based on the evaluation of partial results of research, the following measures are proposed:

1. The Ministry of Education, Science, Research and Sport of the Slovak Republic, in cooperation with the State Institute of Vocational Education and other education institutions, should initiate the elaboration of a *"Professions Sheet"* that would provide measurable and objective information about the possibilities a pupil would get at a particular school. The sheet should target mainly pupils in their 8th and 9th grade as well as their parents (or educational counselors of the school) and help them assess the pupil's needs and personal qualities and assist in the decision-making process.

2. Introduce the proposed *"Professions Sheet"* into schools as a compulsory part of every pupil's personal file.

3. Work with the *"Professions Sheet"* at schools once a year starting in the 6th grade of elementary school (teachers/ educational counsellors should evaluate the results).

4. Consult information obtained through *"Professions Sheet"*, the suitability of pupil's interests and choices made at the educational counselor – parent meetings.

5. The results of long-term monitoring can also serve secondary schools and companies in assessing the suitability of those interested in pursuing dual education.

6. Initiate the production of short television and radio series and shows/podcasts that would provide simple, easy to understand, but at the same time useful information about technical professions and technology-specialized fields of study, e.g. brief job description – requirements, usual place of performance and work environment, technical means of work, requirements on the quality of work, salary, possibilities of further qualification growth and career advancement, job opportunities, future perspective etc., or conditions provided by the school during the study (boarding accommodation, meals, etc.).

7. Broadcast the series at a time acceptable for students and parents (e.g., between 4:00 PM and 6:00 PM, on weekends at 10:00 AM and 2:00 PM, etc.).

8. Ensure information leaflets with the same content are distributed to schools and households.

Conclusion

In Slovakia, positive changes in the behavior and interest of pupils and students with regard to science and technology which have been recorded over the last decade are expected to prompt state bodies, ministries, institutions, media, schools at various levels to promote and come up with activities and projects aimed at popularizing science, technology and technical education. However, investments in these activities, including the adoption of a special law (Act 2015), have not yet significantly addressed these needs and failed to spark interest of students in science, technology and technology-specialized education.

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