# The Curriculum Reform as a Means to Upgrade Technology Education at Lower Secondary Schools in Slovakia

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**Abstract**
In Slovakia, various initiatives aimed at supporting technical or polytechnic education at lower secondary schools (ISCED 2) were carried out. Despite the efforts made, these initiatives did not have a positive effect on increasing the interest of pupils in studying at technical vocational schools (ISCED 3). The curriculum plays a significant role in this. The Ministry of Education, Science, Research and Sports of the Slovak Republic is currently preparing a curriculum reform plan for primary and secondary levels of education (ISCED 1-3). The paper presents the results of a survey focused on assessing the curricular content of the school subject technology from pupils' point of view.
The research survey was carried out with a sample of 101 pupils. To collect research data, a questionnaire was used. The key items of the questionnaire were focused on finding out pupils' favourite subjects, favourite topics or activities, the impact of teaching technology on pupils' professional orientation, and their expectations in connection with technically-oriented subjects taught at secondary schools.
It has been found out that pupils' attitudes to the school subject technology is significantly negative. However, this statement has to be considered not only in relation to the content of the subject but also in relation to the way in which the subject is taught at schools. The pupils express an interest in practical activities during which they can produce various objects or products. When the pupils were asked to evaluate the subject using a traditional classification scale 1 (excellent) – 5 (fail/insufficient), only four pupils rated technology with the grade 1, while up to 11 pupils evaluated the discipline by the grade 5. The final (average) grade of the subject was 3.
**Keywords**: curriculum reform, technical study programs, primary and secondary schools (ISCED 1 – 3), professional orientation, school subject technology.

# Реформа учебных программ как средство повышения уровня технического образования в средних школах Словакии

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**Аннотация**
В Словакии были реализованы различные инициативы по поддержке технического и политехнического образования в средних школах (ISCED 2). Несмотря на предпринятые усилия, данные инициативы не привели к повышению интереса учащихся к обучению в профессиональных технических училищах (ISCED 3). В данном вопросе важную роль играют учебные планы. В настоящее время Министерство образования, науки, исследований и спорта Словацкой Республики разрабатывает план по трансформации учебных программ для начального и среднего образования (ISCED 1–3). В статье представлены результаты исследования, посвященного анализу содержания школьного предмета «Технология» с точки зрения учащихся. Выборку составил 101 человек. Для сбора данных был использован опросник. Основные пункты анкеты были направлены на выявление любимых предметов учащихся, любимых тем или видов деятельности. Часть вопросов была посвящена определению влияния деятельности педагога на профессиональную ориентацию учащихся и их ожидания в отношении предметов технической направленности, которые преподаются в средней школе. В ходе анализа выявлено, что отношение учеников к предмету «Технология» крайне негативное. Это касается не только содержания предмета, но и того, как он преподается. Ученики проявляют интерес к практическим занятиям, во время которых они могут создавать различные предметы или продукты. Когда участников исследования попросили оценить предмет по традиционной шкале от 1 (отлично) до 5 (неудовлетворительно), только четыре учащихся поставили максимальную оценку, а 11 учеников оценили предмет на 5 баллов. В среднем школьники оценили предмет на 3 балла.
**Ключевые слова**: реформа учебных программ, программы технического обучения, начальные и средние школы (ISCED 1–3), профессиональная ориентация, школьный предмет «Технология».

## Introduction

In Slovakia, technology education has always been an integral part of general education and it is carried out within a separate subject taught at the second stage of basic, or primary education (lower secondary education – ISCED 2). At school children should acquire basic knowledge on technology, gain skills in using various technical devices and equipment, and develop an attitude toward technology and technology-focused disciplines, as well as toward possible professional orientation. However, despite the importance of this subject, we have been facing growing problems with its teaching at schools, and with technical education implemented at primary and secondary schools, in general (Tomková, 2019).

**Purpose and objectives of the study**

Among the essential functions of school is the formation of personality through the processes of training and education. However, training and education are always tied to the curriculum content, which is embedded in the school syllabus. The school curriculum can be seen as the result of finding a balance between the societal demands placed on the individual and the individual's educational needs. Therefore, curriculum reforms should focus on the transformation of education in order to introduce effective ways for personal development of pupils and students (Rowan & Miller, 2007). However, the analysis of school reforms implemented over the last three decades in various countries point to a strong link between state ideology and curriculum innovation (Le Métais, 1999; OECD, 2011; Průcha, 2004; Rýdl, 2003). Porubský et al. (2014) point out that issues of educational, school or curriculum reform have become more political and economic than pedagogical in recent years. This refers not only to Slovakia, but also to the broader international context.

From our point of view, the curriculum reform at primary school, including the curriculum change in technology, should strategically contribute to an increase of the pupils' interest in technically-oriented fields of study. Prior to announcing the current reform intentions, a research survey was conducted at the researchers' workplace. The aim was to identify factors that affect pupils as essential determinants of shaping their professional orientation in the category of technical professions and subsequently on the professional direction of pupils. As part of this research, we focused on assessing the subject content from students' point of view.

**Literature review**

Before 1995 technology education was implemented within a separate school subject called *work education*. This subject was taught with the lesson allocation of 2 lessons per week at each grade of the second stage of basic education (relevant to lower secondary education – ISCED 2). The subject *work education* consisted of three components: technical work, cultivation work and family education. Teaching was usually done in groups, separately for boys and girls. The group of boys had two classes of technical work in one week, which alternated with cultivation work. In addition to technical and cultivation work, the group of girls had special training which involved housekeeping, healthy nutrition and child care classes.

This situation has changed twice, in 1996 and in 2008. As a result of the first transformation the name of the subject *work education* was changed to *technical education* and the number of lessons allocated for its teaching was reduced. But the subject was still taught in each grade of the lower secondary education. The next change was made within the curriculum reform in 2008, which introduced State Educational Program and School Educational Programs. This implied the introduction of educational areas for each level of education, into which the particular school subjects have been structured (The Law No. 245/2008 on Education). As to technology education, the school subject *technical education* was renamed to *technology* and was, together with the subjects *manual training* (taught at the first stage of basic education – ISCED 1), *world of work* (taught at the second stage of the basic education – ISCED 2), incorporated into the educational area *A man and the world of the work*. The *technology* subject had a technical focus, and *world of work* subject was focused on cultivation work. On the one hand, introducing a separate subject, *technology*, could be seen as a positive change. However, on the other hand, the time allowance for the subject was reduced to only 1 hour per week. Such an organization of teaching resulted from the curriculum, which defined 0.5 teaching hours per week in the 7$^{th}$ grade and 0.5 teaching hours per week in the 8$^{th}$ grade. As a result of the reduced

time allowance and the related reduced use of school workshops, the school workshops in some schools were gradually closed down for their conversion whether into computer classrooms or language laboratories. Although the adopted measures were intended to increase the readiness of primary school graduates for secondary school studies in technical fields, they ultimately worsened the overall situation (Bánesz, 2014; Hašková, Bánesz, 2015; Hašková, Lukáčová, 2019). Therefore, it was necessary to innovate the newly established State Education Programs for primary schools (ŠPÚ, 2020). Since 2015 there is only one subject in the educational field *Man and the world of work*, and it is the subject of *technology*. Despite the recommendations of the Subject Commission, which worked as an advisory body established by the Ministry of Education, Science, Research and Sports at the State Pedagogical Institute, non-technical thematic units appeared in the content of *technology*, e. g. Cultivation work and breeding, Family education, Food preparation and nutrition, etc. As the mentioned thematic units were not included in particular grades, it has not been yet clear for which grade pupils they are intended. At the same time, there is still inconsistency in the names of school subjects representing the educational field *Man and the world of work* in the first and second stages of primary schools (ISCED 1 and ISCED 2). In the first stage of primary school (ISCED 1), there is a subject *work education*; in the second stage of primary school (ISCED 2), there is a subject *technology*. Also, there is a problem of discontinuity of technical education between pre-primary and primary education. In the first two grades of primary school, there is no subject that would fall into the educational area *Man and the world of work*. This inconceivability can be observed for a long time, practically since 1995 when the time allowance of the subject was halved. However, the efforts were made to preserve all components of the subject: technical work, cultivation work and family education. Following new trends in the education of primary school pupils, the thematic unit world of work has been added to these components, within which the preparation of a primary school graduate for his / her further education in secondary school is expected. This decision is also envisioned to improve chances of a primary school graduate to find employment in the labour market. The members of the Subject Commission, which functioned until 2020, researchers, as well as primary school teachers have long criticized this ambiguity of technical education in primary schools for the educational area of *Man and the world of work* (Pavelka & Plachá, 2018).

At the end of 2020, the Ministry of Education, Science and Research of the Slovak Republic announced its intention to implement a reform in the system of regional schooling. The main innovative element of the Ministry's intention is to put three consecutive training cycles into practice. In case of approval of this innovative element, the goals and content of education prescribed by the Ministry of Education will no longer be tied to individual years but according to the proposal of the State Pedagogical Institute for three educational cycles. According to the proposal, the first three years (grades) of primary school (ISCED 1) should fall into the first cycle, the fourth and fifth years (ISCED 1) into the second cycle, and the sixth to ninth years (ISCED 2) should combine into the third one. Schools will be able to adapt their school curricula, derived from the state one, to individual grades according to the needs of their pupils.

According to the proposal of the new curriculum, the educational area *Man and the world of work* should focus on the development of practical skills in various fields of technology. However, at the same time, it should be supplemented by two complementary units on financial literacy and entrepreneurship development. The fundamental components of the educational area should be three: *Technology*, *Entrepreneurship and initiative* and *Career education*.

The content of the *Technology* component should be designed to develop pupil's technical skills and enable them to master a variety of technological approaches from traditional ones to technologies utilizing pupils' digital skills. The content of the *Entrepreneurship and initiative* component should focus on developing pupils' entrepreneurship skills and an understanding of values that man creates through work. The content of the *Career education* component should be focused on planning the pupil's future in connection with his / her employment at the labour market (ŠPÚ, 2021). These components were previously included in the subject of *technology*, but they were not explicitly identified as specific thematic units.

**Methodology**

This study aimed to assess the content of technology from pupils' point of view. The research was carried out at three primary schools in the Nitra region (two urban and one rural) with a research sample of 101 pupils (39 eighth-grade pupils and 62 ninth-graders; boys and girls 63:38). An own questionnaire, prepared specially for purposes of this study was used as a research instrument to collect data. The questionnaire contained 18 items, some of which were intended only for 9th grade pupils. The important items were designed to find out the pupils' favourite subjects, favourite topics/activities, materials, tools and devices which they use during the technology lessons. The impact of teaching the subject of technology on pupils' professional orientation and their expectations in connection with technically oriented subjects at secondary schools were also analyzed.

**Results**

The collected data were processed and evaluated using descriptive statistics (Čechová, 2020). Given the number of respondents, the survey results cannot be generalized. However, they have their own informative value and indicate the directions in which the further development of the subject curriculum should strategically follow. Hereinafter, we present the findings that emerged while considering the influence of factors of the curricular content of the subject *technology* and the influence of operational aspects of the subject on its popularity.

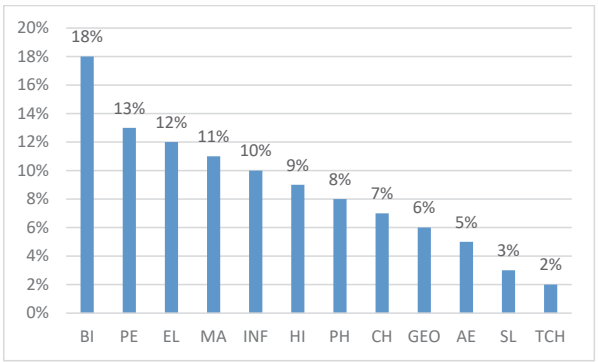
Given the overall results of the evaluation of the popularity of individual subjects, the most important findings are presented below (see Figure 1):

relatively high popularity of mathematics (as in the pedagogical practice and everyday life, we often encounter declarations of negative attitude towards mathematics. Mathematics is very often cited as a reason for low interest in physics, chemistry, and technical sciences, in which it is commonly operated with mathematical apparatus);

decline of popularity of the mother tongue (i.e. popularity of the school subject Slovak language) to the level of popularity of the subject technology (moreover, in great contrast to the result of the English language);

decline of art education in favour of all science subjects (basically all STEM subjects, except unfortunately *technology*).

Pupils' views on the subject *technology* are very unfavourable. Only 2% of eighth-graders stated they enjoyed *technology,* and it is one of their favourite subjects. Ninth-grade pupils did not mention the subject *technology* at all. When the respondents were asked to evaluate the subject of *technology* and its teaching using the traditional classification scale 1 - 5, the subject's final (average) mark was 3. Only four pupils rated the *technology* with a mark of 1; in contrast, in case of even up to 11 pupils *technology* ends with the rating 5 – insufficient (equally 35 times given ratings 3 and 2; 15 times 4).




Legend to Figure 1:
BI - biology
PE - physical education
EL - English language
MA - mathematics
INF - informatics
HI - history
PH - physics
CH - chemistry
GEO - geography
AE - art education
SL - Slovak language
TCH - technology

*Fig. 1. Popularity of the school subjects (Source: own research)*

Curricular factors were analysed examining all grades, in which the subject *technology* is taught. The respondents had to choose a maximum of three thematic units taught in the particular grades, which they enjoyed the most:

*6th grade*

a. technology and product development
b. handicrafts (sewing)
c. work with non-traditional materials (shingles, wirework...)
d. technical drawing, pictogram design, drawing
e. production of things from wood, metal or plastic (wooden booth, metal jewellery, flowers from plastic...)
f. cultivation, transplanting, planting flowers (flower care)
g. electricity, household appliances

*7th grade*

a. production of 3D models
b. animal husbandry
c. kitchen work, essential food ingredients, food preparation, dining, menu production
d. technical materials and their properties (density, weight, strength...)
e. woodwork (drilling, gluing, sanding)
f. household machines (mixer, refrigerator...)
g. choice of profession (police officer, doctor...)

*8th grade*

a. family and housing (bad habits, marriage, wedding, parenthood...)
b. electrical appliances and technical electronics (diodes, sensors...)
c. household economics (energy expenditure)
d. technical documentation (drawing in a graphic editor)
e. world of work (education, career)

*9th grade*

a. history of technology, inventors
b. graphic drawing (graphic software)
c. battery sources, electrical marks, diagrams (wiring of electrical circuits)
d. household appliances (heating, water taps, toilet flushers)

The graphs presented in Figures 2 - 5 summarize the relative numbers of respondents for whom the relevant thematic unit was interesting, entertaining, or engaging. All respondents evaluated the thematic areas taught in grades 6 - 8. The topics taught in the 9th grade were evaluated only by ninth-graders. In all four figures, the first bar graph (marked as answer "-") presents the number of respondents who did not indicate any of the given thematic units taught in the respective grade. Therefore, the first bar graph in each of the Figures 2-5 gives us information about how many pupils of the concerned grade (6th – 9th) were addressed by no of the topics taught in frame of the subject of *technology* in the given year (i.e. number of the pupils of the concerned grade who did not enjoy any of the topics taught in the given grade). As it is evident from the presented graphs, in all four cases (evaluation of the thematic units included in grades 6-9), the percentage of respondents who did not mark any of the given teaching units is relatively high. In the case of the eighth and ninth grades, these are significantly the highest shares. This fact confirms the previous statement that pupils' opinions on *technology* are negative. At the same time, this also indicates that the content focus of the subject of *technology* does not attract pupils (however, the statement about the non-attractiveness of the curriculum must be considered not only concerning the content of the thematic unit, but also the way of its teaching). The respondents did not use the opportunity to identify more thematic units at a time. All of them either did not mark any or chose at most one. There was only one respondent, who marked two thematic units.

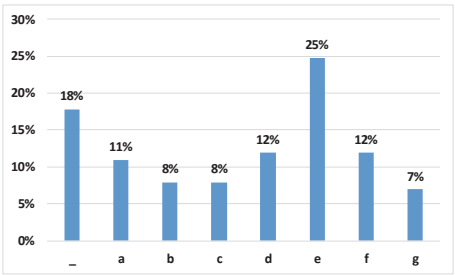



*Fig. 2. Relative numbers of pupils evaluating the topics taught within the subject technology in the 6th grade as interesting (Source: own research)*

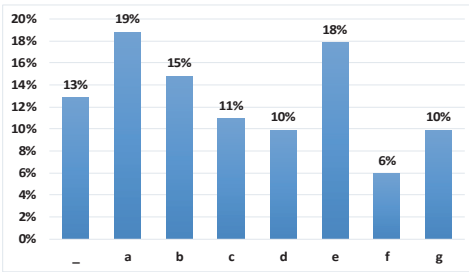



*Fig. 3. Relative numbers of pupils evaluating the topics taught within the subject technology in the 7th grade as interesting (Source: own research)*

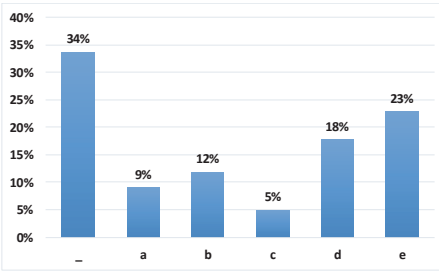



*Fig. 4. Relative numbers of pupils evaluating the topics taught within the subject technology in the 8th grade as interesting (Source: own research)*

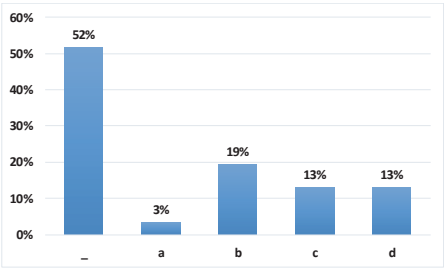



*Fig. 5. Relative numbers of pupils evaluating the topics taught within the subject technology in the 9th grade as interesting (Source: own research)*

In one of the items of the administered questionnaire, we asked the respondents what they enjoyed the most about *technology*. The research participants also had an opportunity to choose up to three options:

– if you have learned how things work (theory),
– if you could produce some things (practical activities),
– if you could work with a computer,
– if you have worked with a kit,
– if you worked with a robot,
– if you have solved any problem tasks,
– if you could set up any connections,
– if you could measure something.

As in the previous cases, a significant number of respondents (more than a quarter, 27%) did not indicate any of the given options. The pupils showed an interest to practical activities, during which they produced various items and products (30%). The received responses included other activities, such as computer work (9%) and problem-solving (2%).

One of the open questions in the administered questionnaire was what should be changed in this subject, what pupils should learn and what should be done to make the subject of *technology* more interesting, more engaging, and more attractive for the pupils. Approximately one third (31%) of the respondents said that they would like to pay more attention to practical matters, which is in line with the raised point that pupils enjoy technology activities most. However, due to the problems with the material and technical provision, teachers of *technology* do not always de facto prefer including practical activities in their teaching. Other sporadically received replies included: walking more in nature, solving logical problems, more technical drawing, making 3D models, and such answers as 'I would not change anything', 'I do not know', or 'not to have the subject of technology at all'.

**Discussion**

In Slovakia, technology education is implemented by means of a separate school subject *technology,* in the frame of which technology-related topics or issues are taught. However, in several countries technology-related curricula are realized within other subjects usually as cross-subject curricula (within cross-curricular topics; Hallström, Hultén, Lövheim, 2013). Philosophy of today's technology education is to perceive it as a coherent learning area (Compton, 2009). It should be understood as an area of education, where various human needs are met, and pupils learn to find out technical solutions to apply the knowledge gained in other subjects (knowledge in natural sciences, social sciences, mathematics and other fields). Whether the technology education is realized under separate school subjects or within the cross-curricular topics, in both cases there is a high need to innovate curricula of these subjects. This need for innovations has to do with expansive technological development and continuously increasing use of technical means in everyday life situations (Kropáč, 2004; Oberliesen, Zöllner, 2007; Walat, 2000). A common tendency of the new progressive education programs of general technical subjects is a tendency to innovate the subject matter maintaining the consistency of relevant content, and an effort to support the development of pupils' creative technical thinking, integrating pupils' knowledge, skills and attitudes, and to increase pupils' independent activity. A strategy for selecting the content (curricula) of technical subjects is more and more influenced by a "user approach" in teaching these subjects. This strategy results in a conception of teaching the technology based on the needs of users of technological means (Kropáč, 1999). As Dostál (2018) states, the idea of teaching the

subject/issue of technology and the related practical activities follows the development of technology and engineering literacy. This is an integral part of STEM teaching.

Regardless of whether the technology education is based on teaching technology separately (as an individual school subject) or on teaching by means of the STEM conception, the relevant curricula should support pupils' (or in general youth's) motivation to study technical and natural science branches. Importance of this requirement has increased under the arising phenomenon of the *Industry 4.0*. In this context, the newly prepared curricula reform should meet the requirements presented by the Fourth Industrial Revolution. (Králik, Máhrik, 2019; Paterson, 2016). However, it seems that the main changes of the announced curricular reform are going to be rather more "formal" than really "curricular". According to the Ministry of Education, Science, Research and Sports of the Slovak Republic, the main innovative element of the reform should be introduction of three consecutive educational cycles. If this innovative element is approved, the objectives and content of education prescribed by the Ministry will no longer be tied to individual grades, but according to the proposal of the State Pedagogical Institute to three educational cycles.

The expected global implementation of the new curriculum into practice is from September 2026. Until then, a change in teacher training for individual educational areas and education cycles is also expected (among other things). How this change will take place is not entirely clear, as universities (including Faculties od Education) are currently in the process of accreditation of study programs, which takes place in a cycle of six years.

**Conclusion**

One of the reasons why Ministry of Education, Science, Research and Sports of the Slovak Republic is currently preparing a curriculum reform of primary and secondary education (ISCED 1-3), is a gap between the current curricula and primary and secondary school graduates' achievements, and requirements put on these graduates. The curriculum plays an important role in developing pupils' interest in the subject. However, the above-mentioned statement about the non-attractiveness of the curriculum has to be considered not only in relation to the content of the subject, but also in relation to the way the subject is taught at schools. What pupils usually appreciate in *technology* teaching is to be given to perform different practical activities, mainly if these are connected with creation of things (products) which can be used in some common everyday situations. The question is to what extent the curriculum reform prepared by the Ministry and its implementation will contribute to the elimination of the mentioned societal problem of insufficient interest of young people in technical professions. Following the Davos agenda (Patterson, 2016), the curriculum reform and its realisation (not only in the meaning of the introduction of the new school subject curricula) should:

– introduce topics, which should inspire the pupils so, that they would find out technology and related concepts exciting;

– support teachers, as many of them do not feel confident to teach with focus on the development of pupils' technology literacy (the key attention of the Ministry of Education in terms of the current curriculum reform is paid to the issue of teacher mentoring (Bilíková et al., 2014; Gadušová & Vítečková, 2014, 2013);

– contribute to the appropriate school equipment; the results of our survey have showed that despite the general negative approach to the *technology* subject, pupils really like practical activities, and it is impossible to hold these activities without having appropriate facilities, technologies, tools, devices, and technical materials.

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**References**

Bánesz, G. (2014). Transformations of technical education within school reforms. *Technologies Contest Pilsen 2014*. Available at: https://www.olympiadatechniky.zcu.cz/@2014/Sbornik_OT2014_online/sekce/Banezs_clanek.pdf

Billiková, A., Gadušová, Z., Harťanská, J., Hockicková, B., Kissová, M., Lomnický, I., Malá, E., Muglová, D., Predanocyová, Ľ., & Žilová, R. (2014). Key competencies of mentor teachers essential for successful mentoring of novice teachers: A research study. *XLingua, 7*(4), 55-74.

Čechová, D. (2020). *Faktory ovplyvňujúce záujem žiakov o technické odbory* [Factors influencing students' interest in technical fields]. Thesis. Nitra. PF UKF.

Compton, V. (2009). Yep-we can do that: Technological response to the curriculum 'needs'. *Design and Technology Education*, *14*(1), 21–36.

Dostál, J. (2018). *Člověk a technika: podkladová studie k revizím Rámcových vzdělávacích programů* [A man and Technology: Background Study to the Revision of Framework Educational Programs]. Olomouc, Národní ústav pro vzdělávání.

Gadušová, Z., & Vítečková, M. (2013). Mentors' and novices' perception of teachers' professional career start in Slovakia and in the Czech Republic. *Procedia – Social and Behavioral Sciences,* vol 106, 1825-1833. DOI: https://doi.org/10.1016/j.sbspro.2013.12.207

Gadušová, Z., & Vítečková, M. (2014). Teachers professional induction in the Czech Republic and Slovakia. *American Journal of Educational Research*. *2*(12), 1131-1137. DOI 10.12691/education-2-12-1

Hallström, J., Hultén, M., & Lövheim, D. (2013). The study of technology as a field of knowledge in general education: Historical insights and methodological considerations from a Swedish case study, 1842–2010. *International Journal of Technology and Design Education*, *24*(2), 121-139. DOI 10.1007/s10798-013-9252-x

Hašková A., & Lukáčová, D. (2016). Assessment of the innovated state educational program impact on technology literacy of lower secondary pupils (ISCED 2). *Ad Alta: Journal of Interdisciplinary Research*, *6*(1), 92-96.

Hašková, A., & Bánesz, G. (2015). *Technology in primary schools - yes or no*. Praha, Verbum.

Králik, R., & Máhrik, T. (2019). Interpersonal relationships as the basis of student moral formation. *Proceedings of the 12th annual International Conference of Education, Research and Innovation ICERI 2019*, 8896–8900. IATED Academy.

Kropáč, J. (1999). K uživatelskému pojetí obsahu technické výchovy [The user concept of the technical education content]. *Modernizace výuky v technicky orientovaných oborech a předmětech*. [Modernization of teaching in technically oriented branches and subjects], 187-190. Olomouc, Univerzita Palackého.

Kropáč, J. (2004). K problému uceleného pojetí výuky obecně technických předmětů [On the problem of a comprehensive concept of general technical subjects teaching]. *e-Pedagogium*, *4*(1).

Law No. 245/2008 on Education : Zákon o výchove a vzdelávaní (školský zákon) a o zmene a doplnení niektorých zákonov. 2008. Available at: http://www.minedu.sk/data/USERDATA/Legislativa/Zakony/2008_245.pdf

Le Métais, J. (1999). Values and Aims in Cirruculum and Assessment Frameworks: A 16 – National Review. Moon, B., Murphy, P. (Eds.): *Curriculum in context*. Barcelona, The Open University.

 

Oberliesen, R., & Zöllner, H.-D. (2007). Kerncurriculum: Beruf – Hauahalt – Technik – Wirtschaft. Ein interdiszciplinäre curriculares Refromprojekt – Leitideen, Entwicklung, Konzeption. [Core curriculum: Profession – household – technology – business. An interdisciplinary curricular reform project – central ideas, development, conception]. *Kompetenzen für eine zukunftsfähige arbeitsorientierte Allgemeinbildung*, [Competences for a sustainable, work-oriented general education]. p. 168-204. Baltmannsweiler, Schneider Verlag Hohengehren GmbH.

OECD. (2011). *Lessons from PISA for the United States Strong Performers and Successful Reformers in Education*. OECD Publishing. doi:http://dx.doi.org/10.1787/9789264096660-en

Patterson, G. (2016). *What children need to know about tech*. Favos, Worl Economic Forum. Available at: http://www.weforum.org/agenda/2016/01/what-children-need-to-know-about-tech

Pavelka, J., & Plachá, I. (2018). Analysis of the state and possibilities of teaching household technology and economics in primary schools in Slovakia. *Technika a vzdelávanie* [Technology and education], *7*(1), 8-13.

Porubský Š., Kosová, B., Doušková, A., Trnka, M., Poliach, V., Fridrichová, P., Adamcová, E., Sabo, R., Lynch, Z., Cachovanová, R., & Simanov, L. (2014). *Škola a kurikulum – transformácia v slovenskom kontexte* [School and curriculum – transformation in Slovak context]. Banská Bystrica, Vydavateľstvo UMB Belianum.

Průcha, J. (2004). *Moderní pedagogika* [Modern Pedagogy]. Praha, Portál.

Rowan, B., & Miller, R. J. (2007). Organizational Strategies for Promoting Instructional Change: Implementation Dynamics in Schools Working With Comprehensive School Reform Providers. *American Educational Research Journal*, vol. 44, 252 – 297.

Rýdl, K. (2003). *Inovace školských systémů* [School system innovation]. Praha, ISV.

ŠPÚ. (2020). *Vzdelávacie štandary* [Educational standards]. Bratislava, ŠPÚ. Available at: https://www.statpedu.sk/sk/svp/statny-vzdelavaci-program/svp-druhy-stupen-zs/vzdelavacie-standardy/

ŠPÚ. (2021a) *Východiská zmien vo vzdelávacích oblastiach* [ *Basis of change in educational areas*]. Bratislava, ŠPÚ. Available at: https://vzdelavanie21.sk/wp-content/uploads/2022/01/2022-01-13-SPU-Vychodiska-zmien-vo-VO.pdf

ŠPÚ. (2021b). *Terminologický slovník* [Terminological dictionary]. Bratislava, ŠPÚ. Available at: https://vzdelavanie21.sk/wp-content/uploads/2022/01/2022-01-13-Glosar. 20pdf

Tomková, V. (2019). Selected factors influencing the choice of secondary school by primary school graduates. *Education - Technology - Informatics*, *10*(3), 224-229.

Walat, W. (2000). *Zestaw rocznych planów pracy dydaktycznej dla nauczycieli techniki-informatyki w gimnazju*m [Collection of annual plans of didactic work for teachers of technology and computer science in a grammar school]. Rzeszów, Wydawnictwo Oświatowe FOSZE.

 