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21st CENTURY SKILLS IN EDUCATIONAL STANDARDS FOR LOWER SECONDARY EDUCATION IN SLOVAKIA

Summary: The aim of this theoretical study is to identify the 21st century skills in the curricular documents for lower secondary education in Slovakia, and to analyse the overlap between the 21st century skills and aims of national educational standards for lower secondary education (ISCED 2) in Slovakia. The main method of the study is document analysis. The analysis shows that the Slovak educational standards are primarily focused on the development of knowledge and cognitive skills. Significantly less represented is development of interpersonal and intrapersonal skills. The results show that there are overall not sufficiently many references to the 21st century skills within the educational standards. This yields a crucial problem, as majority of Slovak teachers still consider the educational standards to be the basic part of curriculum. In spite of certain natural limitations, the study provides new information on the insufficient representation of the 21st century skills in the educational standards in Slovakia.
Keywords: educational standards, document analysis, lower secondary education, 21stcentury skills

Introduction

The World Economic Forum in its recent report on future jobs predicts, based on the current technological trends and the growth of digital information that "65% of children entering primary school today will ultimately end up working in completely new job types that do not yet exist". Moreover, "roughly 50% of knowledge and skills gained by a student of the first year of a technical study will be out-of-date when s(he) graduates"(Tomengová et al., 2017, pp. 27-28).

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The present society is often named as a knowledge, information or learning society. The concepts such as knowledge management, information literacy and competences for the 21st century appear frequently in scientific disciplines. In the near future, according to Kowalski and Albanski (2018), an increasing role will be played by the factor of generational interconnectedness in times of migration together with contradictions and desires of the new global generation.

Experience of OECD countries regarding the 21st century competences and skills was recently summarised by Pellegrino (2017). Three areas of competences and skills were identified – *cognitive, interpersonal, intrapersonal* – and their importance in the 21stcentury, and consequences for education and professional development of teachers were studied. Here we notice that many authors differentiate the concepts *competence* and *skill*. On the other hand, in educational documents of some countries these concepts appear as synonyms as claimed by Ananiadou and Claro (2009). This is also the case of a former national educational programme in Slovakia referred to as ŠVP (2008). In more innovated national educational programme ŠVP (2015), it is stated that educational standards "are formulated as competences, which include knowledge, skills, attitudes and values in the context of defined content of education" (Tomengová et al., 2017, p. 189). In this context the terms *competence* and *skill* are used also in our study and so the concept *competence* is considered to be a broader concept than the concept *skill*.

New education policies around the world call for the development of broad, transferrable skills, often referred to as *the 21stcentury skills*. In order to organise terms for the 21st century skills, and to consider empirical evidence as to their meaning and value. Pellegrino and Hilton (2012) provide a list of some of the most frequently cited 21st century skills and deeper learning skills, and the authors organise them in the mentioned three areas, called *domains*: cognitive domain, which involves reasoning and memory, intrapersonal domain, which involves executive functioning (metacognition) and emotion, and interpersonal domain, which involves expressing ideas, and interpreting and responding to messages from others. In the mentioned Slovak national educational standards ŠVP (2008, 2015), various 21stcentury skills were included: *collaboration, communication, creativity, critical thinking, decision making, exploration, innovation, problem solving, responsibility, self-knowledge, tolerance*. However, "there is a legitimate concern that this is a formal declaration which is not carried out in educational process. Documents regarding the assessment of these skills are missing, and emphasising their development has little influence on the preparation of future teachers in practice"(Tomengová et al., 2017, pp. 191-192).

The development of the 21stcentury skills does not happen separately from learning academic content. Indeed, in the USA there exists a clear commitment to fuse the 21stcentury skills with academic content in all crucial subjects in the US standards, assessments, curriculum, and teacher professional development. They find it important to consider the relationship between the 21stcentury skills and the disciplinary standards that were introduced for English language arts, Mathematics, and Science by

CCSS (2010). Given that these standards will likely shape the curriculum and the instruction in the USA for many years to come, Pellegrino (2017) investigates how each of the different disciplinary standards documents aligns with the concepts of the 21st-century skills.

The aim of the present study is to identify the 21stcentury skills in the curricular document for lower secondary education in Slovakia, and to analyse the overlap between the 21stcentury skills and aims of national educational standards for lower secondary education established in ŠVP (2015). Our study has been motivated by the consideration, by Pellegrino (2017), of the overlaps between the 21st century skills and Common Core State Standards presented in CCSS (2010) in the USA with respect to the subjects English language arts resp. Mathematics. Our tables below mimic in the Slovak context those presented in the US context (Pellegrino, 2017, p. 234 resp. p. 236).

Methods

One of the main aims of this theoretical study is to identify the 21stcentury skills in the basic curricular document for lower secondary education in Slovakia established as ŠVP (2015).The study is based on the primary document and data sources consisting of the publicly available curricular documentation. All educational areas (Man and nature, Man and Values, Man and Society, Man and the world of work, Language and communication, Mathematics and information, Arts and culture, Health and movement) were analysed. The choice of subjects for the analysis was determined by the basic framework curriculum for primary schools with the Slovak language of instruction. Within ŠVP (2015), educational standards for all subjects have analogous structure – they contain introduction, subject objectives, subject characteristic and educational (performance and content) standards. The main method of the study is *document analysis*. In the first phase of research, the authors independently encoded the objectives, characteristics and educational standards of individual subjects to minimize the subjectivity in processing the analysis and to ensure the reliability of the analysis. The sections where the 21st century skills were stated explicitly or indirectly by their descriptions were identified using *open coding*. During the next phase comparison and revision of partial analysis were carried out. This was followed by re-confrontation with the analysed documents.

Results

In the standards for almost all subjects (except Physical Education), similar characteristics of the subject are stated. These claim that learners should *research*, *explore* and *discover*, and thus *inquiry* should be involved in education. In the context of these activities, it is natural to develop skills such as *system thinking*, *critical thinking*, *collaboration*, *self-regulation* or *non-routine problem solving*. However, these activi-

ties are not included in educational standards. In general, lower cognitive processes are preferred in the standards.

References of the 21st century skills can be found mostly in the general objectives for all studied subjects. The occurrence within the educational standards, as established within ŠVP (2015), is sporadic. An exception is the educational standard for Slovak language and literature, in which the key competences that should be developed within each theme are explicitly mentioned.

The information gained from the content analysis is compiled in tables illustrating the relationship between the standards of individual subjects and the 21st century skills. The examples of tables created for Mathematics and Slovak language and literature are presented separately as these are the subjects with the highest recommended time allowance in the basic framework curriculum.

Table 1
Overlap between educational standard (ŠVP, 2015) in Mathematics and the 21st century skills

21st century skills only	Areas of strongest overlap	Discipline-based standards documents only
– Adaptability – Cultural sensitivity, valuing diversity – Motivation, persistence – Identity – Attitudes	– Constructing and evaluating evidence-based arguments – Critical thinking – System thinking – Non-routine problem solving – Complex communication I – (disciplinary discourse, critical reading) – Complex communication II (interpersonal aspects) – Collaboration/teamwork – Self-regulation, executive functioning – Self-development	– Content standard – Knowledge – Algorithmic thinking

The standard for Mathematics is primarily focused on the *cognitive area* development, as shown in Table 1 (cf. also Tomengová et al., 2017, p. 199). *Interpersonal skills* occur in standards less frequently and *cultural sensitivity* and *valuing diversity* is absent among them. Minimal attention is given to *intrapersonal skills* in Mathematics' standards. These are represented only by *self-regulation* and *self-development* within *problem solving*. It is debatable whether the development of individual 21st century skills is really implemented in school practice. According to our experience, we can say that many schools still apply a transmissive approach to Mathematics teaching,

thus the development of *system thinking*, *co-operation*, *self-regulation* and *complex communication* within Mathematics teaching is questionable.

The standard for Slovak language and literature states *key competences* with regard to their transdisciplinary character and their necessity for many activities connected to the learning process. Besides the key competences, the educational standard within ŠVP (2015) also introduces *subject skills* that involve activity of learners and fulfil the conditions of performance and content standards. Although this standard is primarily oriented towards the development of cognitive skills, all three domains – cognitive, interpersonal, intrapersonal – are represented in the standards for Slovak language and literature as shown in Table 2 (cf. also Tomengová et al., 2017, p. 199).

Table 2
Overlap between educational standard (ŠVP, 2015) in Slovak language and literature and the 21st century skills

21st century skills only	Areas of strongest overlap	Discipline-based standards documents only
– Non-routine problem solving – Adaptability – Motivation, persistence	– Complex communication I – (disciplinary discourse, critical reading) – Complex communication II (social/interpersonal aspects) – Critical thinking – Constructing and evaluating evidence-based arguments – Self-regulation, executive functioning – Attitudes – Cultural sensitivity, valuing diversity – Self-development – Collaboration/teamwork – Systems thinking – Identity	– Content standard – Knowledge – Creative thinking – Language rules, grammar – Communication skills – use of proper vocabulary – Creation of tables

Similar tables have been constructed by us for all educational subjects that are included in the national educational programme for lower secondary education in Slovakia as presented in ŠVP (2015). The conclusions of our partial analyses are shown in Table 3.

Table 3
The 21st century skills in subjects' educational standards

	Systems thinking	Complex communication I Disciplinary discourse	Complex communication I Critical reading	Complex communication II. Social /interpersonal aspects	Cultural sensitivity, valuing diversity	Motivation, persistence	Identity	Self-development	Attitudes	Collaboration / teamwork	Adaptability	Constructing and evaluating evidence-based arguments	Non-routine problem solving	Critical thinking	Self-regulation, executive functioning
Biology	x	x	x					x	x				x	x	x
Physics	x	x		x					x	x		x	x	x	x
Chemistry	x	x	x					x				x			x
History	x	x	x	x	x		x		x			x		x	
Geography	x	x	x		x		x		x				x	x	
Civil education	x	x	x	x	x		x	x	x	x				x	x
Technics	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Slovak language and literature	x	x	x	x	x		x	x	x	x		x		x	x
English language	x	x		x	x	x	x	x	x	x				x	x
Mathematics	x	x	x	x				x		x		x	x	x	x
Informatics	x	x	x	x					x	x		x	x	x	x
Music	x	x		x				x	x	x					x
Art	x	x			x		x	x	x	x				x	
Physical education	x	x			x			x	x	x					x

The development of *systems thinking* is mentioned in all educational subjects. It implies an understanding of causality between phenomena, a sense for system functioning – abstract or concrete – natural, technic and social. All educational standards also pay attention to *disciplinary discourse*, although it varies in levels. None of the other 21st century skills is included in all educational subjects.

Cognitive skills that are undervalued are *non-routine problem solving* and *constructing* and *evaluating evidence-based arguments*. These skills, together with *critical thinking* should be instrumental to the development of higher cognitive functions. Out of the intrapersonal domain, the least attention is given to *adaptability*, *motivation* and *identity*. Regarding the interpersonal domain, *cultural sensitivity* and *valuing diversity* are mostly missing among the standards

The need for the development of *adaptability* is barely mentioned in all standards. An exception is the subject Technics where it is explicitly mentioned that learners should be able to adapt to changing work conditions and new tasks. According to the basic framework curriculum, Technics covers less than four percent out of all tuition regarding the total number of lessons provided in lower secondary education in Slova-

kia. It is understandable that the learners' adaptability cannot be developed in each lesson. The adaptability is one of the crucial skills in contemporary changing world and it is indispensable for receiving criticism and getting over failure. The adaptability can be elaborated by means of work on complex group projects within which problems occur and learners have to face them, as claimed by Trilling and Fadel (2009). According to practice experiences, complex projects are absent in tuition of most curricular subjects. It is emphasised by the fact that only few subjects pay attention to *non-routine problem solving*, namely Mathematics, Technics and subjects of natural sciences. The subjects focused on languages, art and movement do not expect non-routine problem solving.

Problem solving is closely connected to *argumentation*. According to the analysis of lower secondary education standards as presented in ŠVP (2015), *constructing* and *evaluating evidence-based arguments* are slightly represented. They occur mostly in Mathematics and subjects of natural sciences where learners create and verify hypotheses. Argumentation supported by evidence is also recommended in curricula of History and Slovak language. Even though it is one of the crucial parts of *critical thinking*, it is absent from the curricula of other subjects.

In case of *critical thinking* there is some evidence for its stimulation in standards of some subjects (Mathematics, Slovak language). However, it is not specified what activities should be used for critical thinking development in these subjects. Because of only formal declaration, it is doubtful whether critical thinking development really occurs in tuition whereas teachers do not have to have specific ideas about ways and activities that would target learners' critical thinking improvement. In some other subjects (Informatics, English language, Physics), the demand for critical thinking development is more specified, e.g. examination of purpose of web page or separation of reliable and non-reliable information. In these cases, second-hand evidence of critical thinking development can be found not only in the aims of the subjects but also in the educational standards. An example is work with information from various sources that is mentioned in several subject curricula. Based on our experience and PISA results of Slovak learners by OECD (2017), it can be claimed that Slovak learners have problems with *searching* and *critical evaluation* of information. Therefore, we consider declaration of critical thinking development in several subjects as purely formal and not carried out in practice.

Another marginally mentioned skill is *motivation* that occurs only in the standards of Technics and English language. This fact is alarming since motivation helps learners to develop their interest in the tuition. Moreover, it is the first step to quality knowledge acquirement without which the true process of learning cannot begin. Learners should establish their goals, work with them and head for their accomplishment. Besides that, it is known that if learners are motivated, then their understanding is deeper and knowledge is more persistent, as demonstrated e.g. by Trilling et al. (2009). One of the possible options for motivation enhancement is the use of *cooperative education* in which learners learn to collaborate in work groups. Nowadays *team-*

work is one of the most requested skills on the labour-market. There is an assumption that in the future almost everybody will be involved in teamwork, often in international teams. Despite this fact, *collaboration* and *teamwork* are absent from subjects that are aimed at professions demanding for it (e.g. doctors, scientists). To a high extent, it also concerns subjects with labs, such as Biology and Chemistry where collaboration is not mentioned in curricula. Nevertheless, in this case, in spite of the missing declaration of the skill in the standards, the collaboration is expected to take part in tuition. On the other hand, it is important to warn of overusing the term *collaboration* (together with another popular term *good practices*)in the standards of subjects as well as in educational documents and policies in general, washing it away of its right sense, as was pointed by *Śliwerski* (2018).

These days it is a challenge for each person to build up once own identity welling out of traditions and cultures that one meets. It is also associated with *tolerance to other cultures*, *valuing diversity* and *approval of other peoples' values* according to Trilling et al. (2009). Various authors conclude that experiences from school have predominant influence on self-appraisal, personal values, interests and career aims. They also emphasise that it is necessary for people to be able to uncover and restore own identity in the constantly changing world. Based on these facts, school education should be also aimed at development of *personal identity* through self-confidence boosting and ability to reflect actual *self-perception* and *identification* as claimed by Kaplan and Flum (2012). From our analysis it follows that there is no impact on formulation and interpretation of learners' own opinions as one of the components of building own identity. Even more alarming is boosting self-confidence, value orientation and adaptive identity. The development of these skills is stated only in the standards of arts and language subjects. However, the focus on identity development is barely mentioned in the standards of these subjects. Space for personal or professional identity development is not satisfactory. It is similar with the development of *cultural sensitivity*.

Discussion and Conclusion

The analysis shows that the educational standards for lower secondary education in Slovakia are primarily focused on the development of knowledge and cognitive skills. The development of intrapersonal and interpersonal skills is not sufficiently represented.

The development of the 21st century skills is mostly declared in the characteristics and objectives of the subjects. There are minimal references to the 21st century skills within the educational standards for lower secondary education in Slovakia. This yields a crucial problem, as majority of Slovak teachers still consider the educational standards to be the basic part of curriculum. Unfortunately, the educational standards are predominantly focused on *acquiring* and *memorizing subject content*. Therefore, if

teachers strictly adhere to the educational standards, they devote minimum attention to development of the 21st century skills.

If we want teachers to develop the 21st century skills, it is necessary to supplement the national educational programme documents by specific ways of the development of the 21st century skills in educational standards. In addition, the national educational programme should include at least examples of good practice, i.e. activities (including tasks, methods and forms) in which it is possible to integrate the development of specific skills with the subject content.

Limitations

One of the limitations is using content analysis as the main method of exploration. Consequently, the conclusions cannot be generalised to the current state of teaching of individual subjects and the development of the 21st century skills. In the future, ideally, the study should be complemented by analysis of school curricula and data obtained from lessons' observations. Nevertheless, in spite of the limitations, the study provides new information on the representation of the 21st century skills in the educational standards for lower secondary education in Slovakia.

Conflict of Interest

No conflict of interest in the study.

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ВЕШТИНЕ 21. ВЕКА У ОБРАЗОВНИМ СТАНДАРДИМА ЗА НИЖЕ СРЕДЊЕ ОБРАЗОВАЊЕ У СЛОВАЧКОЈ

Резиме: Циљ ове теоријске студије је да идентификује вештине 21. века у курикуларним документима за ниже средње образовање у Словачкој, и да анализира преклапање између вештина 21. века и циљева националних образовних стандарда за ниже средње образовање (ISCED 2) у Словачкој. Главни метод студије је анализа докумената. Анализа показује да су словачки образовни стандарди првенствено усмерени на развој знања и когнитивних вештина. Знатно мање заступљен је развој интерперсоналних и интраперсоналних вештина. Резултати показују да генерално нема довољно референци на вештине 21. века у оквиру образовних стандарда. Ово представља кључни проблем, пошто већина словачких наставника још увек сматра да су образовни стандарди основни део наставног плана и програма. Упркос одређеним природним ограничењима, студија пружа нове информације о недовољној заступљености вештина 21. века у образовним стандардима у Словачкој.

Кључне речи: образовни стандарди, анализа докумената, ниже средње образовање, вештине 21.века