

Management of teacher education for safe work

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Abstract

Education and learning in the field of Occupational Health and Safety (OHS) is a process of purposeful and systematic creating and developing the knowledge, professional capabilities, habits and skills, the formation of a conscious relationship, desirable attitudes and forms of behaviour of children, pupils, students and employees in relation to the tasks in the field of occupational safety. In school practice, this means to identify the boundaries of behaviour of the pupils, their observance and the predictability to recognize possible dangers. Education about risks, preventive measures as well as the right response in the case of an adverse event should be a part of the teaching curriculum in all relevant subjects. All this must be done systematically, age-appropriate not only in the family but also by professionally trained teachers. As part of the research the level of knowledge and attitudes of teachers to safety were evaluated at representative school by a questionnaire. A handbook was developed for teachers in the field of safety and the attitudes of teachers were compared by a questionnaire before and after its study. The results confirmed it is necessary to include safety in schools as part of lifelong learning of teachers and their preparation for this profession.

Keywords:

Education and learning
teacher
Occupational Health and Safety

Schlüsselwörter:

Bildung und Lernen
Lehrer
Gesundheit und Sicherheit am Arbeitsplatz

1 Introduction

For registered school accident is considered to be such an injury of a pupil which has become during educational activity at schools, during optional activity organized by school in direct connection with activity at school, during activities done on the order or with an approval of the teacher or the authorized school employee and that is the reason for the absence of a pupil at school lasting for more than three days on the basis of the opinion of the treating physician or death of the pupil (Ministry of Education of the SR, 2009; www.iedu.sk).

As a part of the preparation for the employment the new teachers should receive training for health and safety focusing on risks in schools in order to acquire operational systems for the prevention of danger of their pupils (EU-OSHA, 2004a). The inclusion of such education into the lessons aimed at professional preparation for new teachers is difficult. The case studies show examples of how to proceed in a given strategy (EU-OSHA, 2012). Methods and approaches of the professional preparation include (Fig. 1):

- possibilities for self-learning, especially e-learning or interactive CD-ROMs ;
- blended learning - a combination of distance online learning and contact education, for example at seminars (Delialioglu & Yildirim, 2007),
- active methods of learning when teachers use their own knowledge - this is very important because this is the method how to get closer/ teach the pupils in the classroom during the teaching process (Brečka & Valentová, 2017);
- similar aspects like in other areas of professional education of teachers including their own OHS in courses for new teachers;

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- clearly linking the teacher training to the delivery of the curriculum.

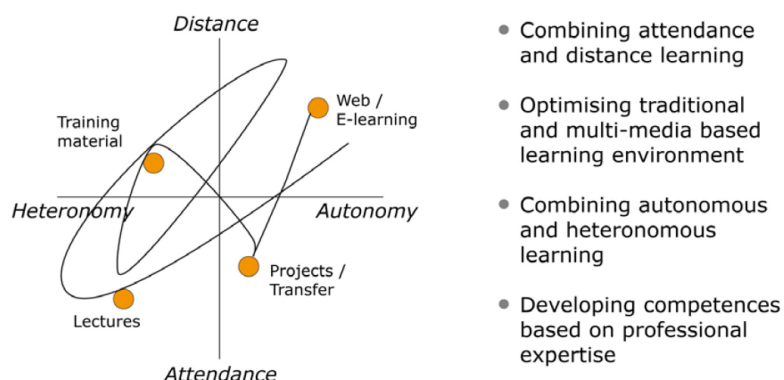


Fig. 1: INQA Lernwelt: Elements of blended learning (EU-OSHA, 2012)

The future development of a coherent strategy for mainstreaming occupational health and safety into education requires the active participation of teachers in key health and safety issues, and risk identification and prevention. This means educating teachers, across all levels of education, in risk education and risk management principles; and, moreover, training them how to teach these principles to pupils. To date there is limited knowledge on how teacher training to delivery risk education is being conducted across Europe, and what key components and factors are common in these training approaches. It is essential that primary and secondary school teachers receive training on how to deliver risk/OSH education

Ideally this training should become part of the curriculum for training future teachers at all levels (primary, general secondary, vocational) (Hrmo et al, 2013). Primary and general secondary (non-vocational) teachers are least likely to receive any training in OSH/risk education (EU-OSHA, 2004b; MacKay & Vincenten, 2012).

2 Methodology

By analysis of available statistical data it was found out that the injury rate of students in Slovakia at primary schools compared with the injury rate at secondary schools is higher (Tureková & Depešová, 2019). Therefore the research part was directed to the environment of primary schools in order to see the level of knowledge of teachers through questionnaires (Tureková & Bagalová, 2018). The decisive criteria in the selection of a primary school, where the research was carried out, were the size, equipments and location of the school in Nitra. As a representative primary school was selected Fatranska primary school. Table 1 shows information about the school, the number of pupils and the number of teachers at second stage involved in the survey.

The selected elementary school offers pupils the opportunity to participate in many competitions, implements school amateur clubs, thereby naturally tends to overall development of knowledge and skills of the pupils [8]. The school tries to innovate continually the teaching equipment, teaching aids and teaching process.

Table 2: Input information about the elementary school in which a questionnaire survey was realized.

School	Number of pupils		Number of teachers involved in the survey
	In total	at 2nd stage	
Fatranska primary school	683	379	43

The research sample consisted of school teachers working in this school. It was necessary that the number of teachers was as big as possible and that the teachers of different subjects were included in the survey. In Fig.2 there are shown the subjects of the selected primary school which are taught by teachers including the number of subjects (one teacher can teach at least one subject and no more than three subjects).

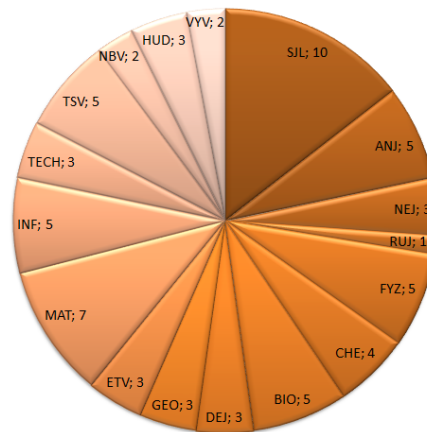


Fig. 2: Subjects taught at Fatranska primary school.

Legend:

- | | | |
|--------------------------------------|-------------------|------------------------------------|
| SJL - Slovak language and literature | BIO - Biology | TECH - Technics |
| ANJ – English language | DEJ - History | TSV - Physical education and sport |
| NEJ – German language | GEO - Geography | NBV - Religious Education |
| RUJ – Russian language | ETV - Ethics | HUD – Music teaching |
| FYZ - Physics | MAT - Mathematics | VYV – Art teaching |
| CHE - Chemistry | INF - Informatics | |

The research was carried out from December 2015 to March 2016 by processing and distribution of the questionnaire. In the questionnaire for teachers of primary schools we investigated their knowledge and attitudes on the issue of OHS as well as the possibility of their implementation in the educational process at primary school.

Based on the processing and evaluation of the collected data but also in regard to statistical data on school accident we created a handbook "Safety and health with a focus on primary schools" in the second phase of the research. The functional safety systems, elements of risk management and implementation methods in the teaching process were explained in clear and illustrative way. Teachers were given this handbook with sufficient time to become familiar with its content. Then we verified again the knowledge of the teachers and the handbook from the point of view of the needs and benefits for teachers by questionnaire.

In the research we used the attitudinal and scidental questionnaire with five-stage scaling (by Likert) (Barua, 2013). The degrees of intensity in the questionnaire are placed from the left to the right. We tried to formulate the differences in verbal expression of the intensity so that the answers were clear and understandable and also the answers could identify lower or higher intensity of approval and disapproval (Table 2).

Table 2: Meaning of the answers of the five-stage verbal scaling in the questionnaire (Albaum, 2012).

Answer	Expression of the attitude or the knowledge	Expression of the time intensity
Yes	I strongly agree	Very often
Rather yes	I agree	Often
Maybe	I do not know with certainty	Sometimes
Rather no	I do not agree	Very rarely
No	I strongly do not agree	Never

3 Results and discussion

The total results of the questionnaire are presented in the Appendix of this article. The answers of teachers in the first questionnaire were taken into account when planning and creating the content of the handbook. The handbook was provided to study for one month. After this period the teachers filled in the same questionnaire for the second time. In the questionnaire there are several items that can reflect the change of knowledge and attitudes of the teachers in OHS. For a discussion we selected the questions 1, 2 and 7 to which the answers vary significantly, the other answers are the part of the questionnaire.

We supposed that there is a correlation between teachers' knowledge gained from the handbook and their answers to the questions from the handbook. To determine this correlation the CHI-quadrat test (Jaďudová et

al, 2017; Bagdonavicius & Nikulin, 2011) has been used where the significance level (alpha) of 0.05 is given for questions 1 and 2 of the questionnaire. Teacher's answers to the question 1 are shown in Fig. 3 and statistical evaluation using the chi-quadrante is in the Table 3.

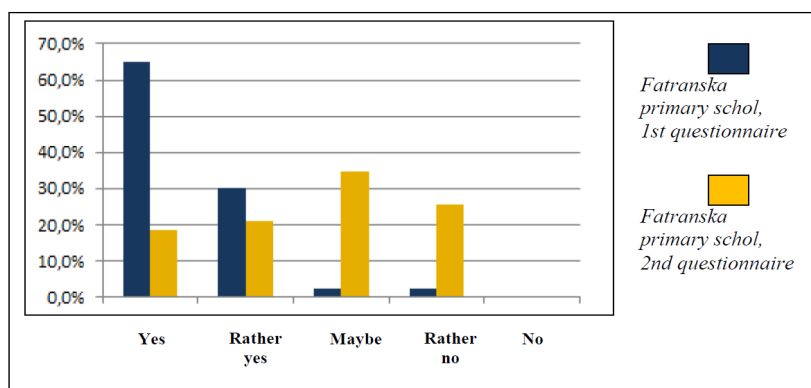


Fig. 3: Answers to the question 1: „Do you receive sufficient information for your work tasks at OHS trainings?“ (Bagalová, 2016)

Values lower than this number show the existence of significant correlation between answers in the first and second questionnaire. The fact that the awareness of safety in making of practical actions by teachers has improved is supported by the study of the properly chosen methodological handbook.

Table 3: CHI test for question 1 of the questionnaire

Question 1: „Do you receive sufficient information for your work tasks at OHS trainings?“			
Count of questionnaire	Column Labels		Grand Total
Row Labels	1	2	
Yes	28	8	36
Maybe	1	15	16
Rather yes	13	9	22
Rather no	1	11	12
Grand Total	43	43	86
CHI			4.26477E-07
alpha			0.05

Teacher's answers to the question 2 are shown in Fig. 4 and statistical evaluation using the chi-quadrante is in the Table 4.

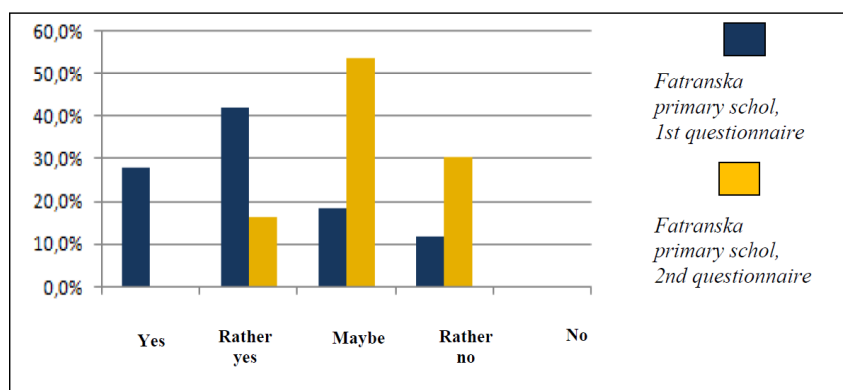


Fig. 4: Answers to the question 2: „For teachers there are resulted responsibilities from the national educational program – how to ensure the OHS, how to lead pupils to understanding and respecting of general principles of OHS as well as the prevention of risks. Do you think that teachers are well prepared for the education of pupils in this area?“ (Bagalová, 2016)

Table 4: CHI test to question 2 of the questionnaire

Question 2: „For teachers there are resulted responsibilities from the national educational program – how to ensure the OHS, how to lead pupils to understanding and respecting of general principles of OHS as well as the prevention of risks. Do you think that teachers are well prepared for the education of pupils in this area?“			
Count of questionnaire	Column Labels		Grand Total
RowLabels	1	2	
Yes	12	0	12
Maybe	8	23	31
Rather yes	18	7	25
Rather no	5	13	18
Grand Total	43	43	86
CHI			4.29377E-06
alpha			0.05

It was confirmed statistically that the systematic training of teachers in OHS is needed. Creating of appropriate content and forms can also have a positive impact on the formation of personalities of students in preparation for future employment, especially so that students know the basic principles of safety and have stabile and good habits in practical activities.

Finally, the teachers could say in a short evaluation sheet if the handbook was helpful (Fig. 5).

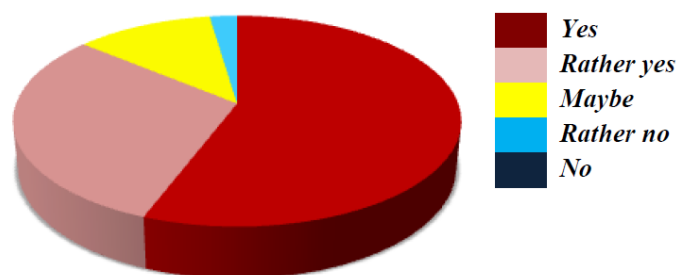


Fig. 5: Teacher's answer to the question: „Was the handbook helpful for orientation in the OHS system?“

Teachers, who had the handbook available for a study for an allowed time, assessed whether the handbook was beneficial for them: yes 55.8 %, rather yes 30.2 %, maybe 11.6 %, rather no 2.3 %, no 0 %.

In the first questionnaire, teachers said they were relatively well prepared for the education of pupils in OHS. In the second questionnaire, the changes have occurred in the scales. More than half of teachers said that they do not know with certainty whether they are well trained and 1/3 of them responded that their preparation for the education of students in OHS is not sufficient.

From the Chi-quadrade test results that there is a correlation between teachers' knowledge gained on the basis of the handbook and their answers to the questions. The handbook brought quite significant changes in the attitudes of teachers. Its aim was to explain the system safety management at schools. It was pointed out to the substantial differences in the types of injuries, methods of first aid, basic terms, early recognition of danger, safety signs, rights and responsibilities of teachers and others.

The most interesting findings were:

- In the first questionnaire only 7 % of teachers knew the difference between school and occupational accident of a pupil, after they studied the handbook this figure has increased to 67.4% of teachers,
- After the study of the handbook the optimistic approach of teachers to recognition the danger of pupils has decreased to 55.8 %,
- After becoming familiar with the handbook the teachers believe that they are able to provide the first aid to pupils better, the number has increased from 46.6 % to 67.4 %,
- 86 % of teachers said that the handbook as a teaching aid helped them to orientate in the system of OHS at schools.

Our research has shown that the complex education of teachers in OHS is not a part of preparation for occupation in Slovakia because such a specialized subject is missing. Therefore this education should be

included into the lifelong learning. 59.3 % of the questioned teachers of elementary schools think that there is a lack of educational materials with practical examples dealing with specific situations in the field of OHS and 2/3 of the teachers are interested in deepening their knowledge in this area.

Instructions for dealing with situations in the management of OHS and illustrated procedures of the optimal solution were provided to teachers by creating of the handbook. The aim of this research was to verify the significance of this handbook from the perspective of the needs of teachers and the asset to the educational process. From the chi-square test it was shown that there is a correlation between teachers' knowledge on the basis of the handbook and their answer to questions. 86 % of the teachers said that the aid helped them to orientate in the OHS system. At the beginning in the first questionnaire most of the teachers expressed a strong approval that they receive sufficient information about the OHS at the schoolings necessary for their job activities. However, in the repeated questionnaire after the study of the handbook 1/3 of teachers answered „maybe“ and ¼ of teachers said that the information is insufficient.

It can be concluded only that it is necessary to pay attention to teacher's education in the field of OHS and to prepare educational materials on this issue.


Hlavičková(2009) and Hlavičková & Kuhnová (2009) published similar information in Czech Republic within the research project „Media and edifying tools of cultivation of human resources“, where the professional readiness of teachers for development of pupil's competences to active development and safety of the physical, mental and social health was verified. Questionnaires were filled in by 339 teachers of primary schools in Czech Republic. The teachers were asked: „Do you consider the existing teaching materials to be sufficient and relevant for the requirement of formation of pupils' competencies to the active development and safety of the physical, mental and social health and responsibility for it and the expected outputs?“ 154 of the teachers consider the existing teaching materials to be satisfying and relevant (45 %), the same number of teachers believe that they are not (45 %) and 31 of the teachers do not know (10 %).

4 CONCLUSIONS

The readiness of teachers to educate pupils in the field of OHS is also closely connected with their professional training and educational materials from which the teacher can draw the necessary information for his/her personal growth. The knowledge of teachers in OHS was verified whereby the basic information were mediated by the handbook. Also teachers had a number of requirements to compile the handbook, unfortunately they were not included into the handbook because of the wide range of requirements. For example, safety in after-school activities as well as safety in sporting activities has a different range and character. The teachers, who had a limited time to study the handbook (approximately one month), considered the handbook to be beneficial for them – upto 80 % of those questioned. The aim of the handbook was to bring to the attention of teachers the basics of the OHS at their work and at familiarization of pupils with it.

Teacher mediates the OHS information to pupils and helps the pupils to understand the general principles of the OHS, points out their importance and their compliance. At the same time teacher points out the activities aimed at the risk prevention. Teachers together with parents are the main element of the cultivation process targeted at creating of the right attitude and the quality value orientation of children and youth. The effectiveness of teaching as a whole depends on the teacher, his knowledge and personal qualities. The teacher, of course, is not seen as the one who knows everything, controls continually, leads and decides. The teacher should be more a facilitator of pupil's learning and development. He should be the one who accompanies the pupil on the way of knowledge, inspires him/her, helps him/her to understand the meaning and connections. Therefore the knowledge about relevant safety issues is essential and complex. And these can be obtained by the future teacher in preparation for his/her profession by including a preset, which would take into account mainly risk assessment and the principles of safety in the school environment.

Appendix 1: Results of the questionnaire (Bagalová, 2016)

No	Questions	Questionnaire	Responses in %				
			Yes	Rather yes	Maybe	Rather no	No
1	Do you get sufficient information needed for your work tasks during the OHS schoolings?	1	65.1	30.2	2.3	2.3	0
		2	18.6	20.9	34.9	25.6	0
2	There are several obligations resulting from the national educational program for teachers like how to ensure the OHS. how to lead pupils to understanding and respecting the general principles of the OHS and how to avoid risks. Do you think that the teachers are well prepared for education of pupils in this area?	1	27.9	41.9	18.6	11.6	0
		2	0	16.3	53.5	30.2	0
3	Should the teacher of vocational subjects receive more information about the OHS (e.g. chemistry, physics, technics, informatics, physical training) than the teacher of other subjects?	1	48.8	27.9	16.3	4.7	2.3
		2	48.8	30.2	20.9	0	0
4	Do you have sufficient educational materials with the practical examples dealing with specific situations in the field of OHS? (e.g., visual aids, exercises)	1	7.0	14.0	11.6	48.8	18.6
		2	2.3	14.0	7.0	46.5	30.2
5	Are the practical situations from the OHS included into the education of pupils?	1	23.3	46.5	11.6	18.6	0
		2	2.3	44.2	37.2	16.3	0
6	Do you think it is sufficient to inform pupils about the OHS by reading of their rights and obligations at the beginning of the school year (e.g. from the Campus establishment)?	1	16.3	16.3	9.3	25.6	32.6
		2	4.7	14.0	23.3	34.9	23.3
7	Are pupils led to the recognition of a danger and to the evaluation of the level of risk?	1	25.6	51.2	14.0	9.3	0
		2	16.3	39.5	30.2	11.6	2.3
8	Do the pupils know risk prevention measures? (e.g. safety signs, etc.)	1	14.0	46.5	23.3	16.3	0
		2	16.3	39.5	30.2	11.6	2.3
9	Do you think that the pupils are able to identify chemical risks (e.g. at using of ordinary chemicals or cleaning compounds) and thus to prevent from an injury?	1	4.7	25.6	34.9	23.3	11.6
		2	2.3	4.7	37.2	51.2	4.7
10	Do you think that the pupils respect their rights and obligations of the OHS, which they were informed at the beginning of the school year with ?	1	2.3	55.8	16.3	20.9	4.7
		2	4.7	41.9	37.2	11.6	4.7
11	Do you think that you are able to provide first aid for a pupil (e.g. in case of loss of consciousness or his/her resuscitation)?	1	14.0	32.6	37.2	14.0	2.3
		2	11.6	55.8	25.6	7.0	0
12	Is the person on the Picture in the anti-shock position ? 	1	37.2	23.3	4.7	9.3	25.6
		2	53.5	27.9	14.0	0	4.7
13	Do you know the rights and responsibilities of a supervising teacher?	1	67.4	25.6	2.3	4.7	0
		2	81.4	18.6	0	0	0
14	Do you consider the supervision of pupils during the school breaks to be exhausting?	1	30.2	51.2	2.3	9.3	7.0
		2	32.6	41.9	9.3	11.6	4.7
15	Are the pupils able to avoid the back injuries ? (e.g. carrying the bags, sitting at desks, working with PC or phone, right carrying of heavy objects)	1	0	14.0	27.9	46.5	11.6
		2	0	9.3	18.6	55.8	16.3
16	Are the pupils able to keep an order in their desks?	1	2.3	32.6	27.9	25.6	11.6
		2	9.3	18.6	37.2	23.3	11.6
17	Do the pupils respect the obligation to clean up after themselves, to wipe or to report when spilling the soup, drink, etc.?	1	20.9	51.2	7.0	16.3	4.7
		2	14.0	48.8	11.6	23.3	2.3
18	Is there a difference between work and school injury of a pupil?	1	7.0	14.0	48.8	11.6	18.6
		2	67.4	20.9	11.6	0	0
19	Would you like to receive a material that contains more detailed information on what to do at pupil's injury?	1	58.1	27.9	9.3	2.3	2.3
		2	53.5	23.3	20.9	2.3	0
20	Based on the requirements from practice is the national educational program sufficiently focused on the education of pupils in OHS ?	1	16.3	16.3	37.2	27.9	2.3
		2	4.7	9.3	53.5	25.6	7.0
21	Are you interested in deepening your knowledge in the field of OHS?	1	20.9	34.9	37.2	2.3	4.7
		2	25.6	34.9	30.2	0	9.3
22	Would you welcome a teaching material that will help in the education of pupils in OHS based on demands from practice?	1	51.2	34.9	9.3	2.3	2.3
		2	53.5	32.6	14.0	0	0

23	In this section, cross the fields where you would like to deepen your knowledge of OHS (you can cross more fields) – the results show the number of teachers:		
<input type="checkbox"/>	Rights and duties of the teacher	<input type="checkbox"/>	Risks of teacher’s work and prevention
<input type="checkbox"/>	Rights and duties of the pupil	<input type="checkbox"/>	Accident rate at schools, procedure of accident reporting
<input type="checkbox"/>	After-school activities	<input type="checkbox"/>	Safe principles and procedures for planning and organizing of teaching
<input type="checkbox"/> other fields:			

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