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Reviews

Introduction

Dear readers,

This year we have tried to focus all issues of our magazine on specific problems in contemporary Czech and foreign education. For the Czech education, it is unquestionably a new concept of inclusive education, which brings many questions and initiatives to not only teachers, but also parents and other practitioners. Similarly to foreign education research, apart from the inclusive education the topics address the issue of literacy, non-formal learning, and intercultural education and 21st century skills. The question of education of refugee children and support their families has an important role too.

In the last issue of our magazine in 2016, there are articles included of which the main denominator is the focus of researches on pupils/students. The article by J. Kusá focused on qualitative research in the writing process, taking into account the cognitive domain of Bloom's taxonomy. The following text is named The Rotation of Seats in the Classroom and the Students' Learning by Carlos Torres and Marta Hudousková, which is a description of an experiment on two groups of students of Spanish language courses. The authors talk about the rotation of seats as one of the aspects of cooperative learning, where students in the experimental group showed better results while respecting the new seating layout. J. Kvintová and colleagues are part of an extensive study on health and fitness of auxiliary musculoskeletal system of conventional secondary school and university students. Subjective evaluation of health and preventive care of the musculoskeletal system among current high school students. Based on research, it is necessary to say that the functional state of the musculoskeletal system of Czech high school and university students is unsatisfactory. These findings should provide a basis for intervention to improve this area. Next is a report on the pilot project of a mixed team of Chinese experts and Olomouc researchers, which determines the depth of the integration of advanced technologies into education at primary and secondary schools in Sichuan province. The issue is closed and complemented by the article Accessibility of Digital Platforms at Universities for Students with Visual Impairment and Blindness by Vojtech and Milan Regec. The aim of this paper is to define selected key determinants of accessibility of a digital platform in tertiary education of students with several visual

impairments. The authors conclude through the means of combined qualitative and quantitative research that the accessibility level of digital platforms of universities is unsatisfactory.

The editors would like to thank all the experts who prepared the reviews of the articles.

Dear readers, dear fans of the e-Pedagogium magazine, we wish you all a successful year 2017.

Editors

Articles

Theory of knowledge space and monitoring of writing process

Jana Kusá

Abstract

In the following text we present a possible approach to monitoring of text production process among elementary school pupils. We proceed from a so-called theory of knowledge space and from knowledge dimension of Bloom's taxonomy of cognitive domain. It covers not only facts and concepts but also process and metacognitive knowledge which are integral parts of writing process itself. These are being often missed out during teaching and evaluation of pupils – attention is in many cases incorrectly paid to knowledge of facts and concepts, mostly text models. In the following paper we present part of the findings resulting from qualitative research survey based on the research work with experimental group of pupils aged 13–14.

Keywords: writing, theory of knowledge space, process knowledge, metacognitive knowledge.

Introduction

Current education, not only within elementary schools, is from the perspective of target orientation focused on acquiring of so-called key competences, it means certain summary of knowledge, skills, abilities, attitudes and values, which are important for personal development and finding one's own place in the society (RVP ZV, 2013). One of the key competences is represented by communication competence. These days we

are able to see communication approach prevailing in education. In many cases, all the attention is incorrectly paid to result communiques. Individual phases of creation of texts or verbal speech are accepted as less important and very often they are not part of evaluation of the pupil's activity. It is an orientation on process of creation of communiqué that represents considerable motivational factor. Furthermore, the respect to processional character has also positive influence on text quality and transfer of learned skills and knowledge.

1 Text competence

Text competence should be understood in direct connection with communication competence but also as a part of cognitive competence. This fact corresponds to present conception of mother tongue education that is based on both communication-pragmatic approach and at the same time cognitive approach. Šebesta (2005, s. 60) summarizes all aspects of communication competence and defines it as "a complex of all mental prerequisites that makes human be able to communicate". Namely it is the knowledge of language code, interaction skills and culture knowledge that determine the form of resulting communiqués and influence the effect of communication itself. Communication competence is formed by partial competences, which only as a whole unit makes an individual to be able to effectively communicate in variable communication situations. In the given context, terms as language competence or text competence are being used. Language competence is the ability to use means of individual language plans (morphological, syntactic, lexical and others) towards effective communication and with respect to communication objective. Text competence includes both receptive skills and ability to create texts and thus communicate adequately one's thoughts, evaluations and plans (Portmann-Tselikas, 2005). Text competence is a comprehensive identification of receptive text competence and productive text competence.[1] Apart from verbal speech it covers the ability to create coherent text communiqués through the usage of cognitive, metatext, language and media competence based on the ability to orientate oneself in intermediary media (for example written language) and following application (Schmölzer-Eibinger, Weidacher, 2007).

Klimovič (2011) is thoroughly concerned with basic objectives and content of the productive text competence development whereas he distinguishes cognitive, metacognitive and communication area. O. Hausenblas (2012) is similarly concerned with target orientation of writing education itself. He states three elementary areas: devel-

[1] It is neccesary to remind that productive text competence cannot be strictly separated from the receptive competence – text recepient must also have knowledge about rules for text creation, about text models etc. Receptive competence is being applied in the whole process of text creation as well (author of the text works with other text materials and receptively process text produced by different author or himself/herself).

opment of coherent thinking (cognitive and metacognitive perspective), support to comprehensive reading (relation to receptive text competence), and development of personal expression (communication perspective).

2 Cognitive and metacognitive aspects of writing process

A lot of approaches to how to define individual phases of process of text creation can be found in expert publications of departmental didactics. Nonetheless, there are differences only in used terminology. Classic concept of writing process is taken for example by Šebesta (2005), who brings 3 stages – invencio, dispositio and elocutio; cyclical rotations take place during the text creation. The process of text creation has been recently divided into 3 phases – prewriting, writing and postwriting (Carroll, 2007 and others). Prewriting includes formulation of the objective, goal of the communication and the topic itself, collecting material and its categorization. Only when the pre-writing stage is finished, the pupil works out microcomposition and stylization. Through this pupil moves to the writing stage, elocutio (Čechová, Styblík, 1998) where he/she chooses language means with respect to recipient and communication objective and he/she consequently organizes tools to form of compact textual communiqué. This stage is followed by postwriting stage. During this stage the pupil reviews own text with respect to the various factors (content perspective, compositional structure, wording level, language perspective).

Within individual stages pupils activate different cognitive processes, which can be stimulated through proper educational intervention. Monitoring of these stages representing the goal of presented research probe is based on the Bloom's taxonomy of cognitive objectives. In the given connection we have to remind that in case of text creation we speak about tasks of complex nature, therefore it is logical that target orientation of the activity touches all taxonomy categories. Moreover, the whole process has cyclical character; it means a repeated activation of cognitive functions takes place. The ability to carry out thought operations of all levels represents precondition for successful management of text creation. This means the ability to stand all levels of Bloom's taxonomy of cognitive objectives (remembering, understanding, applying, analysing, evaluating and creating).

Process of text creation can be also defined in connection with categorization of knowledge dimension. Its revision and enlargement confirms effort to perceive individual teaching tasks just in accordance with its process character.

1. Knowledge of facts: basic elements that pupils must know to be acquainted with discipline and be able to solve its problems. It covers knowledge of terminology and specific details and elements. In connection with the process of text creation we speak about knowledge of method leading to written record of the language,

it means writing system, linguistic terminology, knowledge of vocabulary of the given language, orientation in information sources that can be used when writing the text etc.

2. Knowledge of concepts: mutual relations between basic elements inside larger structures, which allow their mutual functionality. It covers knowledge of classification and categorization, knowledge of principles and generalization, knowledge of theory, models and structure. In relation to writing process the knowledge of individual textual models can be also included in the knowledge of concepts – thus essays and principles of its creation, knowledge of language as a complex structure.
3. Knowledge of process: how to do something, methods of questioning, criteria for usage of skills, algorithms, techniques and methods. It covers knowledge of specific departmental skills, special departmental techniques and methods, knowledge of criteria for usage of relevant procedures. If we look at writing as a process, knowledge of this process is an essential part of pupil's knowledge dimension. Pupil "knows" the process of text creation, is acquainted with the order of individual stages and with criteria of its usage during the composition of communiqué.
4. Metacognitive knowledge: general knowledge of how we recognize and think about our own thinking. It covers knowledge of strategy, cognitive tasks including knowledge of context and conditions. A fundamental part is also represented by self-knowledge in relation to a teaching task. Metacognitive knowledge includes monitoring and regulation of the writing process itself. Pupil therefore acquires not only the procedure but mainly the strategy. Pupils learn to think about themselves concerning a teaching task, it means writing – pupil realizes his/her own abilities, limits etc. (Hacker, 2009, Harris, 2009, Larkin, 2010).

3 Research

The basic objective of the presented stage of the qualitative research was to monitor cognitive and metacognitive processes of older pupils during text production, with focus on detection of possible deficits in both levels. Research survey was participated by 18 pupils aged 13–14 together with the teacher who took part in preparation of the didactical concept and its testing; this was a subject of other stages of the research. In the presented study we present only a part of the research, namely 1st and 2nd monitoring stage that bordered a pedagogical experiment. The experiment was outlined with a view to stimulate cognitive and metacognitive functions of pupils during writing process, it respected the nature of the writing and at the same time it was based on the principles of the method of mediated writing (Málková, 2009, Krejčová, 2013).

During the realization of the monitoring stage of this research survey we used serveral research methods that corresponded to selected qualitative research strategy.

We mainly built on the theory of knowledge space: as stated by Denglerová (2013, p. 210), the theory of knowledge space is a technique "that allows obtaining an idea about knowledge, understanding and abilities of an individual within a certain area." Such knowledge can be arranged to structure, can be analysed and evaluated. The theory of knowledge space works with phenomena of knowledge domain, which means an area (for example educational area, problematic task etc.) composed of partial steps that are necessary to solve out the task. It is the whole process of text production that can be considered as such knowledge (skill) domain. We speak about problematic teaching task that is bordered by two boundary items – formulation of a topic and finished textual communiqué. The space between them is filled with other domain's items – in case of the process of text production it covers cognitive and metacognitive processes, which have to be used by the pupil to produce quality text. The theory of knowledge space further works with so-called knowledge state, which is formed by all items that are correctly being solved by an individual. Denglerová (2013, with reference to authors of the theory) declares that the knowledge state is essential for individual diagnostics – in this connection we remind Feurstein's measures of cognitive functions (Feurstein, 2006), which is based on systematic monitoring of pupil's work and allows to set functions that are deficit.

Within the first and second monitoring stage of this research we were observing which items from the separate stages (prewriting, writing, and postwriting) are known by individuals from the experimental group and to which extent – at first we were monitoring selected areas of the knowledge dimension, namely metacognitive knowledge and process knowledge[2]. In the monitored period, an experimental group worked with two stylistic units – explicatory essay and essay itself. Research tool monitored planning of the whole process (pupils were creating manuals of how to write the given stylistic unit) and it also allowed to monitor writing process itself – the task definition involved the structure of individual items within the knowledge domain. Research tool included sequence of leading questions and assignments that allowed us to monitor the way of activation of the pupils' cognitive and metacognitive processes (pupils were led to verbalize writing procedure and at the same time to put the individual steps through reflexion).

[2] Knowledge of facts and conceptual knowledge were subject to the next research stage that was also aimed at the analysis of the resulting communiqués – but again in relation to progress of the whole writing process.

4 Results

Knowledge structure among the experimental group of pupils at process and metacognitive level is characterized in the following features:
Factor 1 – perceived academic effectiveness and relationship to the teaching task: writing of texts is a popular activity among the monitored group. The topic and creative freedom represent motivational factors. If pupils have negative relationship to writing, they confess they are not able to orientate themselves in the individual steps and to plan the whole process. The awareness of possible transfer also has a connection to relationship to the teaching task. Based on the research probe we were able to find out that large part of pupils carry out the task without knowing possible future usage of the partial activities or the whole process, at school or outside it. Second group of pupils deals with the teaching task with awareness of the transfer, at level of knowledge (obtaining knowledge about given topic), at interpersonal level (getting familiar with classmates' opinions, sharing their own opinion) or in the area of cognitive processes themselves, which can be used outside the classes (flow of thoughts, reasoning, considering the topic, thinking about something in life, concentration, decision making). Higher awareness of transfer was shown in the second monitoring stage, which means after the experimental intervention, where intermediation of transfer was accented.

Factor 2 – monitoring and knowledge of process: during verbalisation of the solution algorithm significant differences between pupils occurred. Pupils at A level manage to plan the procedure during the task solution, whereas they work with all parts of the knowledge domain – they prove a high level of knowledge of the process. Pupils at B level leave out partial steps in the individual stages (mainly in stage of prewriting and postwriting – although after realization of the experimental intervention the prewriting stage was not left out any more), knowledge of process is therefore partially deficient which signalizes a deficit in the metacognitive area. We observed significantly deficient process and metacognitive knowledge at level C. Pupils plan and carry out limited number of partial steps – they often write off the top of their head, without preparatory and final stage of the text production. They are not aware of the writing's process character; they focus on the text itself only. This discourages them from writing itself; fear from not managing the task is also very often. In the first monitoring stage group B was prevailing, after realization of the pedagogical experiment it was group A that was significantly represented – pupils managed to verbalize used strategy, then use it in the writing process together with awareness of its possible transfer.

Conclusion

Development of pupils' productive text competence has to be perceived and carried out with respect to complexity of the process of text creation. The presented study accents the process and metacognitive level of writing and warns of the need to monitor and evaluate these levels. Research survey's objective is to point out the structure of the process of text creation. During its monitoring we grounded on the theory of knowledge space – therefore we try to define all steps leading to creation of the text. Process and metacognitive dimension presents its inseparable part. Results of monitoring of the pupils within the given areas refer to significant differences between pupils, to positive influence of experimental intervention and to direct the relation between individual items of knowledge domain and quality of the whole process' procedure.

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References

Carroll, J. A. (2007). *Acts of Teaching: How to Teach Writing. A Text, a Reader, a Narrative*. Portsmouth: Teacher Ideas Press.

Čechová, M., & Styblík, V. (1998). *Čeština a její vyučování*. Praha: SPN, 1998.

Denglerová, D. (2013). Teorie vědomostního prostoru. In Gulová, L., & Šíp, R. (eds.). *Výzkumné metody v pedagogické praxi*. Praha: Grada.

Feuerstein, R. et al. (2006). *The Feuerstein Instrumental Enrichment Program: Creating and Enhancing Cognitive Modi ability*. Jerusalem: ICELP Publications.

Hacker, J. D. et al. (2009). Writing is Applied Metacognition. In Hacker, J. D. et al. *Handbook of Metacognition in Education*. New York and London: Routledge, Taylor & Francis.

Hausenblas, O. (2012). Startéry pro psaní. *Kritické listy* 45, 19–20.

Harris, K. R. et al. (2009). Metacognition and Children's Writing. In Hacker, J. D. et al. *Handbook of Metacognition in Education*. New York and London: Routledge, Taylor & Francis.

Klimovič, M. (2011). Rozvíjanie produkčnej textovej kompetencie dieťaťa mladšieho školského veku. Ľ. Liptáková, et al., *Integrovaná didaktika slovenského jazyka a literatúry pre primárne vzdelávanie* (p. 232–282). Prešov: Prešovská univerzita v Prešove.

Krejčová, L. (2013). *Žáci potřebují přemýšlet*. Praha: Portál.

Larkin, S. (2010). *Metacognition in Young Children*. New York: Routledge, Taylor & Francis.

Málková, G. (2009). *Zprostředkované učení: Jak učit žáky myslet a učit se*. Praha: Portál.

Portmann-Tselikas, P. R. *Was ist Textkompetenz?* [online]. 2013 [cit. 2016-09-10]. Retrieved from: https://www.uzh.ch/ds/wiki/ssl-dir/Textkompetenz/uploads/Main/PortmannTextkompetenz.pdf

Upravený Rámcový vzdělávací program pro základní vzdělávání. [online]. 2013 [cit. 2016-09-10]. Retrieved from: http://www.msmt.cz/vzdelavani/zakladni-vzdelavani/upraveny-ramcovy-vzdelavaci-program-pro-zakladni-vzdelavani.

Schmölzer-Eibinger, S., & Weidacher, G. (eds.). (2007). *Textkompetenz. Eine Schlüsselkompetenz und ihre Vermittlung.* Tübingen: Gunter Narr Verlag.

Šebesta, K. (2005). *Od jazyka ke komunikaci*. Praha: Karolinum.

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The rotation of Seats in the Classroom and the Students' Learning

Carlos Torres, Marta Hudousková

Abstract

The paper describes a research done in two groups of Spanish language courses at a technical-oriented university. The aim of the research was to demonstrate the influence of the controlled rotation of seats on the fluency and interaction during a thematic dialogue in a conversation class. The rotation of seats in the classroom is considered one of the aspects of the cooperative learning. The rotation of seats is a classroom technique that allows the teacher to gain power and competence to influence students' performance in a class as well as final exam results. The investigation consisted in the comparison of the final exam conversation results in a class where students were asked to follow a certain seating arrangement (an experimental group) and in a group were they were allowed to sit as they chose to (a traditional group). The result was that students from the experimental group achieved better results in the final exam. The statistical theory and the method of hypothesis testing was used for the analysis of the quantitative data.

Keywords: Assigned Seating Arrangement, Language Testing, Language Assessment, Second Language Acquisition, Seating Position in the Classroom.

Klíčová slova: zasedací pořádek, jazykové testování, jazykové hodnocení, akvizice druhého jazyka, místo k sezení ve třídě.

Introduction

The cooperative learning is an approach in the field of education that aims at helping students to learn from each other and perform activities during the class with other classmates as well as enjoy the learning more. According to Slavin (1990), the cooperative learning is not just "structuring positive interdependence" among students in a group. As Olsen points out in cooperative learning students learn "how to work as a part of a team and have others depending on you".

An assigned seating arrangement, or in other words the controlled rotation of seats, can be viewed as one of the cooperative learning approach classroom techniques. With the assigned seating arrangement the teacher can influence and decide where students will be seated in the classroom, with whom they will do communicative and other activities, so the teacher can thus increase their learning benefits. Undoubtedly, this classroom technique improves the second language communicative skills. Researchers who investigated the role of the assigned seating arrangement, like Juhary (2012), conclude that this teaching method is viewed positively by students.

1 Methods

The objective of this paper is to examine the benefits the assigned seating arrangement used by two language teachers in second language courses at the University of Life Sciences in Prague as well as describe an experiment that was carried out in two groups of A2 Spanish language courses. The aim of the experiment was to demonstrate the influence of the controlled rotation of seats on the fluency and interaction during a thematic dialogue in a conversation class. The level A2 was chosen for the monitoring for being the most heterogeneous level with respect to the knowledge of the language. The monitoring had to be performed during four semesters because the number of students at this level is not very high. In the first group that will be called a traditional group, students could sit every lesson as they wanted (i.e. choosing themselves their neighbour and thus a conversation partner). In the other group that will be called an experimental group, students had to follow a certain seating arrangement. The seating plan was prepared in advance by a teacher in a way that students had a different seat so that in every class they had a different conversation partner with whom they performed various communicative activities. In the traditional group there were 76 students, in the experimental group 66 students. The aim was in both groups to prepare students for the final exam that was to be taken in pairs.

At the end of each semester, students took a conversation exam. After four semesters had passed, a total of 142 dialogues were performed in conversation exams. Students were assessed during the exam by teachers' filling out the following report.

Each report had a name and surname of the student on it as well as the name and surname of the conversation partner and a topic of the exam dialogue. Each category in Fig. 1 was assessed by allotting points according to students' performance in the exam.

Figure 1

					Points
Grammar 0–30	Only the Present Tense	Only the Past Tense	Mix of Tenses		
Vocabulary 0–30	Minimum	Textbook	Additional Materials		
Fluency 0–20	Very short sentences	Short sentences	Complete and complex sentences		
Interaction 0–15	Very passive	Passive	Active		
Adequacy 0–5	Minimum	Partial	Complete		
	Total				

Although fluency and interaction were the most important aspects of the assessment, also grammar, the vocabulary used and the adequacy of the dialogue were taken into account. As far as grammar was concerned, mark score was given according to the use of tenses, however the correct usage of articles, prepositions and pronouns were also considered. The vocabulary was assessed as "minimal" if students used only verb "ser" (to be) and "tener" (to have) and if they limited themselves to words learned for the topic. A higher score was obtained if they resorted to many more terms from the coursebook. And the maximum score was obtained if they also applied the vocabulary from the additional materials used during the semester. In the assessment of fluency a minimum score was given if students limited themselves just to monosyllables. As

for the interaction, it was considered whether the student resorted just to answering questions (score "very passive"), responded to questions and repeated responses from their interlocutor adapting them to the reality (score "passive") or dared to introduce the topic, improvise questions and answers as well as make comments that developed the topic and added the information (score "active"). The dialogues had to meet certain criteria. According to the compliance with these criteria the adequacy was assessed.

The statistical theory of hypothesis testing and also the contingency tables were used for the analysis of the quantitative data.

The contingency tables show the results of grammar in the group with the rotation of seats (Fig. 2) and in the group without rotation of seats (Fig. 3). 97 % of students from the traditional group used only the present tense, while in the experimental group 50 % of students used only the present tense, 38 % used the past tense and 12 % used both tenses.

Figure 2

	Description of Columns			
Description of Rows	**Gram A**	**Gram B**	**Gram C**	**Total**
With rotation				
Number – Grammar	33	25	8	66
Number – Grammar2	50 %	38 %	12 %	100 %
Without rotation				
Number – Grammar	74	2		76
Number – Grammar2	97 %	3 %	0 %	100 %
Total – Grammar	**107**	**27**	**8**	**142**
Total – Grammar2	**75 %**	**19 %**	**6 %**	**100 %**

The following contingency table shows the results of vocabulary assessment. It is quite clear that students from the experimental group have built a wider vocabulary, because 64 % of them were able to use not only the vocabulary learnt from the textbook but also from additional materials that had been prepared for each lesson and students had to download them from the Moodle application, print them out and take to a class. Whereas in the traditional group the highest number of students (39 %) were able to use only the minimum vocabulary.

Figure 3

	Description of Columns			
Description of Rows	**Voc A**	**Voc B**	**Voc C**	**Total**
With rotation				
Number – Voc	14	10	42	66
Number – Voc2	21 %	15 %	64 %	100 %
Without rotation				
Number – Voc	30	19	27	76
Number – Voc2	39 %	25 %	36 %	100 %
Total – Voc	**44**	**29**	**69**	**142**
Total – Voc2	**31 %**	**20 %**	**49 %**	**100 %**

The contingency table for fluency (Fig. 4) shows a similar tendency in results to those of grammar and vocabulary. Again, like in the two previous contingency tables the results show that up to 65 % of students in the experimental groups were able to use complete and complex sentences, whereas in the traditional group it was only 21 % and 49 % of students used just short sentences.

Figure 4

	Description of Columns			
Description of Rows	**Fluency A**	**Fluency B**	**Fluency C**	**Total**
With rotation				
Number – Fluency	10	13	43	66
Number – Fluency2	15 %	20 %	65 %	100 %
Without rotation				
Number – Fluency	23	37	16	76
Number – Fluency2	30 %	49 %	21 %	100 %
Total – Fluency	**33**	**50**	**59**	**142**
Total – Fluency2	**23 %**	**35 %**	**42 %**	**100 %**

Not surprisingly, the contingency table for interaction (Fig. 5) confirms the same tendency in the results. In the experimental group up to 47 % of students actively interacted with their conversation partner, while in the traditional group only 22 %. In the traditional group the highest number of students (39 %) was able to interact in a very passive way.

Figure 5

	Description of Columns			
Description of Rows	**Inter A**	**Inter B**	**Inter C**	**Total**
With rotation				
Number – Interaction	12	23	31	66
Number – Interaction2	18 %	35 %	47 %	100 %
Without rotation				
Number – Interaction	30	29	17	76
Number – Interaction2	39 %	38 %	22 %	100 %
Total – Interaction	**42**	**52**	**48**	**142**
Total – Interaction2	**30 %**	**37 %**	**34 %**	**100 %**

Having gathered the above-mentioned results, the following step was to find out using the F-test and the t-test if students from the group with a seating arrangement have the same results in a final conversation exam on a 1–100 point marking scale as students that were allowed to sit as they chose to.

The zero and alternative hypothesis was established as follows:

The 0 hypothesis: there is no difference in the final exam results between the experimental and traditional group.

The alternative hypothesis: yes, there is a difference in results between the two groups.

Besides, the aim was to investigate how the rotation of seats influences the results in the fluency and interaction part of the thematic dialogue.

Figure 6

The results of the F-test

Two sample F-test for variance		
	Variable 1	*Variable 2*
Mean	61,53030303	46,77631579
Variance	144,7759907	68,97596491
Observation	66	76
df	65	75
F	2,098933895	
P(F<=f) (1)	0,00103266	
F Critical (1)	1,482397868	

By doing the two sample F-test for variance it was investigated whether the variance values of the average score equal in population of the experimental and the traditional group. The Variable 1 is the experimental group (average score is 61.5 % and Variable 2 (the average score is 46.8 %) is the traditional group. After the two sample F-test for variance was done it was found out that the P-value is lower than 0.05. It means that the population variances are not equal. For this reason a two sample t-test assuming unequal variances was carried out.

Figure 7
Two sample unequal variance t-test

Two sample unequal variance t-test		
	Variable 1	*Variable 2*
Mean	62	47
Variance	145	69
Observation	66	76
Hypothesized Mean Difference	0	
df	113	
t Stat	8,378142248	
P(T<=t) (1)	8,32488E-14	
t Critical (1)	1,658450217	
P(T<=t) (2)	1,66498E-13	
t Critical (2)	1,981180296	

These tables show that there is statistically a significant difference between the results of students in both groups and it makes sense to make statistical analysis and do the test of fluency and interaction.

Figure 8
The results of the two sample F test for variance

	Variable 1	*Variable 2*
Mean	14	10
Variance	32	22
Observation	66	76
df	65	75
F	1,483297636	
P(F<=f) (1)	0,049740417	
F Critical (1)	1,482397868	

Figure 9
Two sample unequal variance t-test results

	Variable 1	*Variable 2*
Mean	14	10
Variance	32	22
Observation	66	76
Hypothesized Mean Difference	0	
df	126	
t Stat	4,455289	
P(T<=t) (1)	9,14E-06	
t Critical (1)	1,657037	
P(T<=t) (2)	1,83E-05	
t Critical (2)	1,978971	

The results of the contingency table in Fig. 10 indicate that it is statistically proved that the rotation of seats matters in the fluency. The difference between the two populations is statistically significant, not random.

Figure 10

	Description of Columns			
Description of Rows	**Fluency A**	**Fluency B**	**Fluency C**	**Total**
With rotation				
Number – Fluency	10	13	43	66
Number – Fluency2	15 %	20 %	65 %	100,00 %
Without rotation				
Number – Fluency	23	37	16	76
Number – Fluency2	30 %	49 %	21 %	100,00 %
Total – Fluency	**33**	**50**	**59**	**142**
Total – Fluency2	**23 %**	**35 %**	**42 %**	**100,00 %**
Observed frequencies	10	13	43	66
	23	37	16	76
	33	50	59	142
Expected frequencies	15,338	23,239	27,423	
	17,662	26,761	31,577	
Significance of the Chi-Square Test				6,69345E-07

The same process was repeated with interaction. Again, a two sample F test for variance and a two sample unequal variance t-test were carried out (see Fig. 11 and Fig. 12).

Figure 11

Two sample F test for variance		
	Variable 1	*Variable 2*
Mean	10	8
Variance	15	11
Observation	66	76
df	65	75
F	1,279076132	
P(F<=f) (1)	0,151317182	
F Critical (1)	1,482397868	

Figure 12

Two sample unequal variance t-test		
	Variable 1	*Variable 2*
Mean	10	8
Variance	15	11
Observation	66	76
Hypothesized Mean Difference	0	
df	131	
t Stat	4,034459	
P(T<=t) (1)	4,62E-05	
t Critical (1)	1,656569	
P(T<=t) (2)	9,25E-05	
t Critical (2)	1,978239	

The results in the final table (Fig. 13) of interaction demonstrate that significance of the Chi-Square test is lower than 0.05 which leads to the conclusion that statistically there is a difference between the two groups of students.

Figure 13

	Description of Columns			
Description of Rows	**Inter A**	**Inter B**	**Inter C**	**Total**
With rotation				
Number – Interaction	12	23	31	66
Number – Interaction2	18 %	35 %	47 %	100,00 %
Without rotation				
Number – Interaction	30	29	17	76
Number – Interaction2	39 %	38 %	22 %	100,00 %
Total – Interaction	**42**	**52**	**48**	**142**
Total – Interaction2	**30 %**	**37 %**	**34 %**	**100,00 %**
Observed frequencies	12	23	31	66
	30	29	17	76
	42	52	48	142
Expected frequencies	19,521	24,169	22,310	
	22,479	27,831	25,690	
Significance of the Chi-Square Test				0,002679243

1.2 Results

1.2.1 Grammar

Students that were used to the rotation of seats dared to use multiple tenses, but with errors. There was a lot of instant self-correction, peer correction and repetition of phrases already corrected. Students from the traditional group demonstrated mastery only of the present tense, although mostly speaking slowly and sometimes reciting the phrases quietly.

1.2.2 Vocabulary

As already mentioned, the A2 level students were the most heterogeneous group; however, each student had different previous knowledge. As for the vocabulary used, the influence of pre-university linguistic studies was observed in both groups.

In fact, some of the participants of the experiment belonged to a higher level (level B1).

1.2.3 Fluency

In both groups both shyness and spontaneity was appreciated. This also affected the fluency and its assessment. The experimental group showed greater spontaneity. The students from the traditional group limited themselves to a large extent to merely repeating questions from their partner.

1.2.4 Interaction

The reaction of the participants during the dialogue was in some cases in both groups by deduction, although it was demonstrated that they did not have to understand everything that was said by the interlocutor.

In order to pass the exam at the end of the semester the students were evaluated individually, although they were examined in pairs. The students passed a conversation exam. They had to talk about a topic that they drew lots for following instructions about the sequence of the discourse according to certain previous experience and coming to a conclusion. They could not use any learning aids.

Conclusion

The F-test performed shows that in the conversation classes the controlled rotation of seats has an influence on the results and the final grade of the participants when an oral conversation exam is performed. According to the F- test performed, the fluency and interaction of a thematic dialogue increase between interlocutors that have a conversation with different people and under a number of circumstances. A seating arrangement in a language class is a great help for this purpose.

In the conversation classes the fluency and interaction in dialogues become more enjoyable and have more easiness when carried out between different partners.

The Chi-Square test performed shows that the positive influence of the controlled rotation of seats in a conversation class is not something random.

The controlled rotation of seats in language classes can be recommended for all language levels.

The rotation of seats (assigned by the teacher) is not a voluntary choice of the students although it is positively viewed *a posteriori*. The rotation helps to homogenize groups initially heterogeneous, makes the class more pleasant, and reinforces the socialization among students and the cooperative learning.

References

Anas A. (2010). Towards a Well Organized Classroom: Seating Arrangements. *British Council: Teaching English.* Retrieved from: http://www.teachingenglish.org.uk/blogs/ammaranas/towards-a-well-organized-classroom-seating-arrangements.

Hudousková, M; Torres, C. (2015). The Influence of an Assigned Seating Arrangement on the Student's Learning. *Lingua Viva*, XI, 21.

Juhary, J. (2012). An Assigned Seating Arrangement Based on Students' Performance: A Critical Review. *Journal of Education and Practice*, *Vol. 3 No. 14.* Retrieved from: http://www.iiste.org/Journals/index.php/JEP/article/view/3414.

Ngware, M. W., Ciera, J., Musyoka, P. K., Oketch, M. (2013). The Influence of the Classroom Seating Position on Student Learning Gains in Promary Schools in Kenya. *Creative Education*, *Vol. 4*, *No. 11.* Retrieved from: http://file.scirp.org/Html/38928.html.

Olsen P. What is Cooperative Learning in the Classroom? Strategies, Benefits and Definition. *Educational Portal.* Retrieved from: http://education-portal.com/academy/lesson/what-is-cooperative-learning-in-the-classroom-strategies-benefits-definition.html.

Slavin R. E. (1990). Cooperative Learning. *Review of Educational Research*, 1980, Vol. 50, No. 2, Pp. 315–342. Retrieved from: http://journals.sagepub.com/doi/pdf/10.3102/00346543050002315.

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Subjective evaluation of health and preventive care of the musculoskeletal system among current high school students

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Abstract

The submitted study represents a part of an extensive study focused on health and condition of the auxiliary musculoskeletal system in current high school and university students. Based on our research practice we can state that the functional condition of the musculoskeletal system of Czech high school and university students is unsatisfactory. The data of several research subsets have been presented within this research project. In order to gain a more complex insight into the area of the auxiliary musculoskeletal system, we carried out a questionnaire-style research focused on subjective evaluation of health and its individual components. A total of 1 022 high school students took part in this research, and 569 university students were used to compare the results. Besides that, the high school students took part in a survey to assess complementary activities aimed at improving the auxiliary musculoskeletal system. The goal of this survey was to assess the subjective level of health and its components in present-day high school students, and simultaneously evaluate activities connected to the care of the auxiliary musculoskeletal system. The outputs of this survey may serve for future work with students and for overall improvement of the functional auxiliary musculoskeletal system, and thus health in general. We assume that the submitted findings will be used

in further work with our students in terms of health, healthy growth and development, and the prevention of negative phenomena in the area of the musculoskeletal system.

Key words: health education, health promotion, students.

Introduction

The assessment of the condition and functioning of the musculoskeletal system can be considered as an important part of man's health. The World Health Organization (WHO) defines health as "the state of complete physical, mental and social well-being, not merely the absence of disease or infirmity" (WHO, 2016). This progressive definition has become an important divide in viewing the whole problem of health as an area, where besides the biological aspect, the social aspect of health and illness is important, too. The fact that the definition places an emphasis on wholeness or whole as the main feature of health at all is valuable. At the same time, it accentuates health as a positive, generally desired value (Křivohlavý, 2009; Payne et al., 2005).

The way an individual maintains his health, besides endogenous dispositions, depends mainly on a complex of behavioral aspects. Currently, these aspects relating mainly to the individual behavior of an individual are classified within the term lifestyle. Thus lifestyle represents one of the most important protective health factors (Pluijm et al, 2007). Lifestyle and personal behavior influence the health of an individual in 50–60 % (Dolanský, 2008; Machová & Kubátová, 2009). Its influence takes effect in a whole range of life areas – family, school, workplace, leisure time activities, etc. In case we want to influence the health and lifestyle of an individual in a positive context and within primary prevention, it is necessary to start with the youngest age categories. The position of the WHO is that the behavior and lifestyle in adulthood are the results of a person's development in childhood and adolescence. From the viewpoint of public health, the monitoring of the occurrence of behavioral components affecting the health of children and adolescents is important (Kalman, Hamřík, & Pavelka, 2009).

If we significantly connect the lifestyle of an individual with his musculoskeletal activity, we can speak of an active lifestyle. That is considered as a certain system of important activities and relations and interconnected practices focused on achieving a full-fledged and harmonious state between the physical and mental sides of men (Valjent, 2008).

Musculoskeletal activity has accompanied man since the beginning of his evolution. In the past 50 000 years of the so-called Homo sapiens sapiens, only small changes have modified life functions of men. Compared to hunters and gatherers, an urbanized man of the present day is exposed to totally different life conditions. Mainly a lack of movement and excessive energy intake characteristic for sedentary lifestyle lead to

regulatory systems disorders that were set up for different life conditions (Stejskal, 2004). Musculoskeletal inactivity in combination with bad eating habits then lead to the occurrence of multiple noninfectious diseases that are currently the cause of 60 % of all deaths in the world (WHO). Sedentary lifestyle is represented by a lack of physical activity (PA) both at work and during one's leisure time. Fatigue caused by psychological stress and a lack of movement decreases man's activity so much that he consumes more than he gives out. These facts are then negatively demonstrated in multiple physical systems, lead to the onset of the above mentioned diseases and decrease an individual's quality of life in general.

Negative influences will thus demonstrate also on the condition of the auxiliary musculoskeletal system. The condition of the present-day population in the area of the musculoskeletal system is very unsatisfactory. Various disorders in the area of the muscle system that are one of the significant causes of painful conditions of the musculoskeletal system are diagnosed increasingly often (Dostálová, Sigmund, & Kvintová, 2013; Kolář et al., 2009; Kopecký, 2010; Véle, 2012). For optimum functioning of the skeletal muscles there needs to be an optimum functional ratio between the postural and phasic muscles. The trend of unsatisfactory condition of the auxiliary musculoskeletal system is now observed even in the youngest age categories, and it is closely related to the school regimen of children that does not allow spontaneous musculoskeletal activity, and thus helps to give rise to such disorders. The static-dynamic function of the musculoskeletal system is disrupted, which leads to various musculoskeletal substitutions, clinical syndromes, and a decrease in the tolerance threshold of physical stress (Kolář, 2006). Based on our own survey we can state that the highest occurrence of muscular imbalance in high school students was found in knee-joint extensors (71.2 %) and knee-joint flexors (63.7 %) (Dostálová & Sigmund, 2017). Other frequent areas of muscle shortening are in the lumbar area of spine erectors and the thigh fascia stretcher. It turns out that all significantly higher values of muscle shortening were found in boys compared to girls. Different occurrence of muscular imbalance is not monitored only in hypokinetic individuals but also in the sporting population, thus becoming one of the biological risk factors that limit sport performance and contribute to the origination of various injuries and premature development of degenerative disorders of the auxiliary musculoskeletal system (Dostálová, 2013). The need for increased attention paid to the auxiliary musculoskeletal system is mainly accented in children and youth since mainly here it is possible to effectively help, namely in the sense of primary prevention. For this reason, it is necessary to discover such problems in time and rectify them using a suitable corrective activity in respect to the individual needs of every individual.

The submitted study represents a part of an extensive study focused on the health and condition of the auxiliary musculoskeletal system in present-day high school and college students. In order to gain a more complex insight into the area of the auxiliary musculoskeletal system, we carried out a questionnaire-style research focused on subjective evaluation of health and its individual components.

Besides that, the high school students took part in a survey to assess complementary activities aimed at improving the auxiliary musculoskeletal system.

Based on our research practice we can state that the functional condition of the musculoskeletal system of Czech high school and university students is unsatisfactory. The data of several research subsets have been presented within this research project.

We asked the following research questions: 1). What is the level of subjectively perceived health in present-day high school students? 2). What preventive measures in respect to preventive care of the auxiliary musculoskeletal system do present-day high school students apply?

The goal of this research is to assess the subjective level of health and its components in present-day high school students, and simultaneously evaluate activities relating to the care of the auxiliary musculoskeletal system.

1 Methods

Research sample

The study involved a total of 1 022 high school students (49 % boys; 51 % girls) from selected high school in Olomouc and North Moravian region and 569 university students (37 % male; 63 % female) from Palacký University in Olomouc. The survey and data collection were carried out in year 2015. In terms of age, the study was conducted on high school students aged from 16 to 19. The overall age variability of the research sample of university students was between 19 and 26 years. Data of university students are presented for comparison with the main target group of high school students.

In terms of ethical aspects, all participants in the survey were fully informed of its purpose and of a possibility to terminate their participation at any time without giving a reason. All participants were informed of further data processing and ensuring anonymity. Each participant was involved on a voluntary basis and consented to data processing and publication.

Data collection methods

To assess the current level of life satisfaction, the research study used a standardized psychodiagnostic tool – Life Satisfaction Questionnaire (LSQ) (Rodná & Rodný, 2001). The Czech version of the LSQ is based on the original German questionnaire Fragebogen zur Lebenszufriedenheit (FLZ) (Fahrenberg, Myrtek, Schumacher, & Brähler, 2000). The LSQ is designed for standardized description of inter-individual and intra-individual life satisfaction variability. Each of the specified items contains seven statements. For each statement in each item the respondent tries to express the current level of satisfaction by selecting on a seven-grade scale; 1 = very dissatisfied, 7 = very satisfied. The Health item was elaborated and analyzed in more detail. Furthermore, the question-

naire was applied focusing on issues related to alternative musculoskeletal system. The items related to PA warming up, compensatory-corrective activities, the incidence of chronic diseases and the overall issue of alternative care for musculoskeletal system were evaluated.

Statistical analysis

Statistical result processing was conducted using the Statgraphics programme v. 12.0 (Statistica, Tulsa, USA). For each variable, basic statistical quantities were calculated and distribution normality verified. Normality was assessed using the Shapiro-Wilk normality test. For the assessment of differences in mean values independent sets of two-sided Student t-test were applied. Evaluation of the questionnaire responses was performed using contingency tables, chi-square test. The level of statistical significance was tested at $p \leq 0.05$; $p \leq 0.01$. To assess Effect of Size, the Cohen's coefficient defined as a difference between two means divided by a standard deviation for the data, where the value of d 0.2 = small effect, d 0.5 = medium effect and d 0.8 = large effect (Cortina & Nouri, 2000; Thomas, Nelson, & Silverman 2011) was applied.

2 Results and Discussion

The results section presents the main findings concerning subjective assessment of health and preventive care of the musculoskeletal system in the research sample of current high school students. To compare the results in the area of health, the authors used reference data and data based on their own research aimed at university students.

In the group of high school students, the authors observed an overall lower level in the assessment of own health compared with reference values based on the Life Satisfaction Questionnaire. A comparison of the overall values of the level of health and its subcomponents with the sample of university students suggests statistically and materially insignificant differences between high school students and university students (Table 1). A detailed analysis by gender revealed a trend of higher satisfaction with own health in male respondents, both among high school students and university students. These findings are consistent with other studies aimed at the issue of health (Kvintová, Sigmund, & Hřebíčková, 2014; Kvintová & Sigmund, 2012).

Table 1
Level of subjectively perceived health and its components on current high school students compared to university students

Health	High school students ($n = 1022$)		University students ($n = 569$)		Δ	p	d
	M ± SD	Range	M ± SD	Range			
Somatic health condition	5.1 ± 1.28	1–7	5.0 ± 1.39	1–7	0.1	ns	0.08
Mental condition	5.2 ± 1.40	1–7	5.2 ± 1.42	1–7	0	ns	0.00
Physical condition	4.7 ± 1.38	1–7	4.5 ± 1.53	1–7	0.2	ns	0.14
Mental performance	5.1 ± 1.34	1–7	5.3 ± 1.27	1–7	0.2	ns	0.15
Immunity	5.2 ± 1.67	1–7	5.1 ± 1.52	1–7	0.1	ns	0.06
Pain frequency	4.6 ± 1.53	1–7	4.5 ± 1.69	1–7	0.1	ns	0.06
Disease frequency	5.0 ± 1.59	1–7	4.9 ± 1.74	1–7	0.1	ns	0.06
Health Total	32.6 ± 6.36	11–45	33.0 ± 6.73	11–49	0.4	ns	0.06

Legend: n – frequency; M – arithmetic mean; SD – standard deviation; Δ – difference; p – statistical significance; ns – non significant; d – Cohen's d Effect of Size

2.1 Results of a questionnaire survey aimed at physical activity and care of the musculoskeletal system in current high school students aged 16 to 19 years

The question on PA asked how often current high school students pursued PA. The answer 'regularly' indicated physical activity at least three times a week of at least 60 minutes (in total 180 minutes). It was observed that 56 % of high school students indicated regular PA. A significantly higher proportion of regular PA was observed in boys compared with girls (Table 2). Irregular PA was reported by 40 % of high school students with significantly higher values in girls. No PA was reported by 4 % of high school students with a higher proportion of girls. In relation to PA, it was observed that 29 % of high school students considered themselves active athletes. A significantly higher proportion was observed in boys compared with girls (Table 2). In terms of caring for the musculoskeletal system, the survey focused on how students performed a warm-up before physical activity. The answer 'regularly' indicated a warm-up prior to any PA. A total of 42 % of students reported a regular warm-up. This was indicated by an insignificantly higher proportion of boys compared with girls. 47 % of respondents reported an irregular warm-up prior to PA, and 11 % of reported no warm-up. The difference between the answers of boys and girls was statistically insignificant (Table 2). In terms of caring for the musculoskeletal system, the survey also focused on how stu-

dents performed compensation and corrective activities after PA. The answer 'regularly' indicated compensation and corrective activities aimed particularly at the muscular system after completion of any PA. A total of 19 % of students reported regular compensation and corrective activities. 52 % of respondents reported irregular and 19 % no compensation activities. The difference between the answers of boys and girls was statistically insignificant (Table 2). The incidence of chronic diseases in the sample of high school students represents 20 %, with identical values in boys and girls (Table 2). In terms of specific diseases, the most frequently reported diseases were allergy and type 1 diabetes mellitus. The respondents indicated negligible incidence of chronic diseases associated with the musculoskeletal system.

Table 2
Current high school students – physical activity and chronic diseases

	Total ($n = 1\,022$)		**Boys** ($n = 502$)		**Girls** ($n = 520$)		**Chi-square** $\chi 2$ (Ch × D)
	n	%	*n*	%	*n*	%	
Physical activity							
Regularly	569	56	329	66	240	46	8.117**
Irregularly	405	40	157	31	248	48	6.047*
None	48	4	16	3	32	6	1.047
Physical activity – registered athletes							
Yes	296	29	190	38	106	20	7.868**
No	726	71	312	62	414	80	
Physical activity – warming							
Regularly	434	42	241	48	193	37	2.476
Irregularly	475	47	224	45	251	48	0.181
None	113	11	37	7	76	15	3.269
Physical activity – stretching, compensatory-corrective activity							
Regularly	198	19	97	19	101	19	0
Irregularly	532	52	249	50	283	55	0.501
None	292	29	156	31	136	26	0.613
Chronic diseases							
Yes	203	20	98	20	105	20	0
No	819	80	404	80	415	80	

The assessment of ergonomic measures in relation to the musculoskeletal system focuses on whether the respondent uses for example a suitable chair, has a well-organized workplace (space, desk), uses a suitable bed (frames, mattress), anatomically shaped

backpack, luggage on wheels, handles objects in a proper way, etc. A total of 17 % of high school students reported that they applied ergonomic measures in terms of caring for their musculoskeletal system. This was indicated by a significantly higher proportion of boys compared with girls (Table 3). The question on activities associated with good posture focuses on whether the respondent performs posture correction in various positions regularly throughout the day. A total of 41 % of high school students reported regular posture correction with a significant predominance of boys. The question on the application of water regeneration procedures asks whether these activities are a regular part of caring for the musculoskeletal system. A total of 13 % of high school students indicated the application of water regeneration procedures as a regular part of caring for their musculoskeletal system. This was indicated by a significantly higher proportion of boys compared with girls. The use of appropriate footwear was the subject of a separate question because caring for the leg and the foot significantly determines the overall condition of the musculoskeletal system. A total of 17 % of high school students reported the use of appropriate footwear. This was indicated by a significantly higher proportion of boys (31 %) compared with girls (4 %) (Table 3). The question on active health exercise asks whether the respondent deliberately performs PA associated with compensation and corrective activities aimed at the musculoskeletal system at least once a week. A total of 17 % of high school students reported such activity. This was indicated by a significantly higher proportion of boys compared with girls. A total of 10 % of high school students reported regular use of medicine. Regular use of food supplements was reported by a total of 23 % of high school students. The use of food supplements was indicated by a significantly higher proportion of boys (37 %) compared with girls (9 %) (Table 3).

Table 3
Current hight school students and alternative care for musculoskeletal system

Alternative care for musculoskeletal system	**Total** ($n = 1\,022$)		**Boys** ($n = 502$)		**Girls** ($n = 520$)		**Chi-square** $\chi 2$ (Ch × D)
	n	%	*n*	%	*n*	%	
Ergonomic measures							
Yes	177	17	143	29	34	7	16.396**
No	845	83	359	71	486	93	
Activities related to the right to possession							
Yes	414	41	373	74	41	8	90.037**
No	608	59	129	26	479	92	

Water regeneration procedures							
Yes	131	13	99	20	32	6	8.665**
No	891	87	403	80	488	94	
The use of appropriate footwear							
Yes	178	17	156	31	22	4	25.247**
No	844	83	346	69	498	96	
Active health exercise							
Yes	203	20	98	20	105	20	14.174**
No	819	80	404	80	415	80	
Regular use of drugs							
Yes	106	10	63	13	43	8	1.330
No	916	90	439	87	477	92	
Regular use of supplements							
Yes	234	23	186	37	48	9	22.134**
No	788	77	316	63	472	91	

Deliberate PA and other preventive activities aimed at supporting the musculoskeletal system represent an important part of caring for the musculoskeletal system of an adolescent. Research studies performed by the authors suggest that the functional state of the musculoskeletal system in Czech students is unsatisfactory. Therefore, it is imperative to work with the students on a practical level in terms of preventing or compensation of negative functional consequences. It is also important to implement theoretical knowledge in classes and educational curricula in order to improve the education of health and healthy behavioral aspects relating to the musculoskeletal system – both in terms of primary and secondary prevention with the application of appropriate compensation and corrective activities. Horkel and Horklová (2004) confirmed that training exercise incorporated in school-based physical education significantly improved muscle balance. At the same time, however, stated that physical education lessons contained little or no training exercise focused on muscle balance. The selection of activities should primarily focus on differentiated elimination of insufficiencies in the physical development and PA of students with regard to their individual needs. Most functional disorders and painful areas in children and youth are located in the lumbar and pelvic regions. The incidence of pain correlates with age, length and type of PA (Thurzová, 2003).

It is therefore necessary for children's PA to include from an early age a variety of corrective activities in order to eliminate muscle imbalances and to maintain an optimum condition of the musculoskeletal system or correct any existing disorders and substitutions (Dostálová, Sigmund, & Kvintová, 2013). Disorders of muscle functions and locomotive stereotypes were observed both in children with low PA and children

subject to unilateral load during sport. If special compensation exercise is not used, PA and high fitness are not sufficient to protect children and adolescents from muscle imbalances. Functional muscle imbalance should be a sufficient incentive for the development of optimal physical activity programs in the school environment.

3 Conclusions

The main results of the present survey aimed at subjective assessment of health and care of the musculoskeletal system in high school students are as follows:

- Subjective assessment of health in current high school students and university students is lower than reference values,
- subjective assessment of health and its subcomponents in current high school students and university students is almost identical and shows insignificant differences,
- 56 % of high school students report regular PA, with a significant predominance of boys,
- 29 % of high school students report their active engagement in sport, with a significant predominance of boys,
- 42 % of high school students report regular warm-up prior to PA,
- 19 % of high school students report regular compensation and corrective activities after PA
- 20 % of high school students report the incidence of chronic disease,
- 17 % of high school students report the application of ergonomic measures in terms of caring for the musculoskeletal system, with a significant predominance of boys,
- 41 % of high school students report regular posture correction, with a significant predominance of boys.
- 13 % of high school students report regular application of water regeneration procedures as a part of caring for the musculoskeletal system, with a significant predominance of boys,
- 17 % of high school students report the use of appropriate footwear, with a significant predominance of boys,
- 17 % of high school students report active health exercise at least once a week aimed at compensation and corrective activities with a focus on the musculoskeletal system,
- 10 % of high school students report regular use of medicine,
- 23 % of high school students report regular use of food supplements, with a significant predominance of boys.

This study represents a part of an extensive research aimed at the condition of the musculoskeletal system in Czech students. This particular part focuses on high school students, whose functional state of the muscular system is unsatisfactory. Compensation and corrective activities do not include only specific types of PA but also other activities that can positively affect the quality of the locomotor system. Some of them were indicated in the mentioned study. Generally, the results are unsatisfactory. The outcomes of the survey can be used for further work with students and for overall improvement of the functional state of the musculoskeletal system and health in general. This should prevent further deterioration of the function of the musculoskeletal system in children and youth that could lead to more serious disorders of the musculoskeletal system. We assume that the findings will be used in further work with students in terms of promoting health, healthy growth and development, and prevention of negative phenomena concerning the musculoskeletal system.

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References

Cortina, J. M., & Nouri, H. (2000). *E ect size for ANOVA design*. Thousand Oaks, CA: Sage publications.
Dolanský, H. (2008). *Veřejné zdravotnictví.* Opava: Slezská univerzita v Opavě.
Dostálová, I., Sigmund, M. (2017). *Pohybový systém.* Olomouc: Poznání.
Dostálová, I., Sigmund, M., & Kvintová, J. (2013). Theoretical and practical aspects of health physical education in the Czech Republic. *e-Pedagogium*, *2*, 110–124.
Fahrenberg, J., Myrtek, M., Schumacher, J. & Brähler, E. (2000). *Fragebogen zur Lebenszufriedenheit (FLZ). Handanweisung.* Göttingen: Hogrefe.
Horkel, V., & Horklová, H. (2004). Úroveň svalové nerovnováhy u žáků 2. stupně základní školy. In M. Nosek (Ed.), *Sborník referátů z vědeckého semináře s mezinárodní účastí Pohyb a výchova* (pp. 33–36). Ústí nad Labem: Univerzita Jana Evangelisty Purkyně.
Kalman, M., Hamřík, Z. & Pavelka, J. (2009). *Podpora pohybové aktivity: Pro odbornou veřejnost.* Olomouc: Ore – Institut.
Kolář, P. (2006). Vertebrogenní obtíže a stabilizační funkce svalů – diagnostika. *Rehabilitace a fyzikální lékařství*, *4*, 155–170.
Kolář, P. et al. (2009). *Rehabilitace v klinické praxi.* Praha: Galén.
Kopecký, M. (2010). *Zdravotní tělesná výchova.* Olomouc: Univerzita Palackého, Fakulta tělesné kultury.
Křivohlavý, J. (2009). *Psychologie zdraví.* Praha: Portál.

Kvintová, J., & Sigmund, M. (2012). Psychosocial Aspects of Stress in Current University Students. *e-Pedagogium*, *4*, 59–69.
Kvintová, J., Sigmund, M., & Hřebíčková, H. (2014). Live satisfaction and subjective health assessment in future teachers compared with current university students of physical culture and natural science. *e-Pedagogium*, *2*, 15–30.
Machová, J., & Kubátová, D. et al. (2009). *Výchova ke zdraví.* Praha: Grada.
Payne, J. a kol. (2005). *Kvalita života a zdraví.* Praha: Triton.
Pluijm, S. M. F., Visser, M., Puts, M. T. E., Dik, M. G., Schalk, B. W. M., Van Schoor, N. M., Schaap, L. A., Deeg, D. J. H., & Bosscher, R. J. (2007). Unhealthy lifestyles during the life course: association with physical decline in late life. *Aging Clinical and Experimental Research*, *19*(1), 75–83.
Rodná, K., & Rodný, T. (2001). *Dotazník životní spokojenosti.* Praha: Testcentrum.
Sigmund, M., Kvintová J., Hřebíčková, Šafář, M., & Sigmundová, D. (2014). Live satisfaction, health, self-evaluation and sexuality in current university students of sport sciences, education and natural sciences. *Acta Gymnica*, *44*(4), 231–241.
Sigmund, M., Kvintová, J., Dostálová, I., & Hamřík, Z. (2013). Selected personality traits and achievement motivation in university students of physical culture, education and natural sciences. *Acta Universitatis Palackianae Olomucensis. Gymnica*, *43*(3), 37–47.
Stejskal, P. (2004). *Proč a jak se zdravě hýbat.* Břeclav: Presstempus.
Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2011). *Research methods in physical activity* (6th ed.). Champaign, IL: Human Kinetics.
Thurzová, E. (2003). Bolesť pohybového aparátu u mladých športovcov. *Telesná výchova a šport*, *13*(1), 31–35.
Valjent, Z. (2008). Pokus o vymezení pojmu Aktivní životní styl. *Česká kinantropologie*, *12*(2), 42–50.
Véle, F. (2012). *Vyšetření hybných funkcí.* Praha: Triton.
WHO (2003). *WHO de nition of Health.* Retrieved on 4. 12. 2013 from the World Wide Web: http://www.who.int/about/definition/en/print.html
WHO (2016).World Health Organization. Retrieved on 21. 10. 2016 from the World Wide Web: http://www.who.int/about/mission/en/

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The report of investigation primary school and lower secondary school education informatization in Leshan city

Qianjun Tang, Jitka Laitochova, David Nocar, Liang Mengjiao

Abstract

As the project team continuous researched for Sichuan province comprehensive reform pilot project of the 2nd that is "depth integration of modern education technology into the primary and lower secondary school education pilot", we investigated the education informatization in 5 representative schools in the area of pilot launched a pilot area. We mainly focused on the sample school education informatization of hardware and software environment, teachers' skills of information technology, the usage of information resources and the education media, and teachers' awareness and attitude of information technology in education. For data collection we mainly adopted questionnaire, interview and visit three ways for data collection. Through the data collected in detail, quantitative analysis and qualitative analysis, we drew the corresponding conclusion about the various aspects above.

Keywords: the education of primary and lower secondary school, education informatization, information technology, the skills of information technology, training teacher.

Introduction

To continue to research the 2nd pilot comprehensive education reform project in Sichuan province in depth integration of modern education technology into the primary and lower secondary school education, the project team needs to know the situation of the pilot schools which are hardware and software of, the teachers' skill of ICT and the attitude and awareness towards ICT. In January 2016, the project team did an investigation in some schools in the pilot area: Shanwan district, Leshan city.

1 Design of the Investigation

In order to acquire the exact and full data about primary and lower secondary school informatization, my colleagues and I prepared and design the investigation very carefully and thoroughly. We together discussed the time, the sample of schools, the teachers from the sample school and our main aim in the investigation.

1.1 Content and Objective of the Investigation

Why do we investigate? It is the first thing we must think about carefully before we entered the schools. We wanted to know about the hardware, the software, the digital resources, the information situation and the attitude of the teachers in the pilot school.

1.1.1 The Basic Informatization Situation in the Schools

We wanted to know about the hardware and software of the schools, such as the schools' address, scale, faculty and the ranking in the area etc. For the hardware, we needed to know the campus website's input width and output width, the amount of the computer room, the performance of the computers, the ratio of student and computer, the amount and the performance of multimedia classroom, the hardware of the office, the performance of the campus website server. About the software, we needed to know the office-automatic and the instruction resources.

1.1.2 The Situation of Usage of Hardware and Software

The frequency of usage of computer room and multimedia classroom, application ICT in prepared lessons, class lessons, homework and tutorship, evaluating the students, and management, etc. were all cared about in this investigation.

1.1.3 Status of Teachers' ICT Skills

We planned to investigate the situation of ICT applied by teachers, such as media routine application, computer and internet usage (information filtering and selection), basic units of MS and specific curriculum software apprehension. Part of this information can be collected from teachers' interviews, whereas the other by questionnaires in which the data is analyzed through the quantitative method.

1.1.4 Teachers' Attitude and Perception towards educational informatization

How teachers evaluate the educational informatization, and what are the advantages and disadvantages of the educational informatization.

1.2 Sample selection

In accordance with the presentation above, we take school as the sample unit. Referring to the objective requisite, we employed the principle as follows, primary schools mostly and lower secondary schools within obligatory education period, balance with urban and suburban schools. Regarding the quantity consideration, all the work load, difficulties, competence of researchers, 4 primary schools and more (including 2 urban ones, 2 suburban ones), 3 lower secondary schools and more (including 2 urban ones and 1 suburban one), which are supposed to be paid more attention. Additionally, 9 year-obligatory schools are prior to be selected, which can keep the sample capacity along with unloading the study stuff. As the participants of the primary schools, they are the urban schools of Shawan primary school and Fenghuang primary school, the other participants of the primary schools, they are the suburban primary schools of Jianong and Bishan. The 3 participant elementary schools are respectively Fenghuang, Suishan and Bishan. Furthermore, the Fenghuang and Bishan are the 9-years obligatory schools.

When doing the questionnaires for pursuing the data of teachers ICT skills, individual's characteristics cannot be neglected, for instance, age, teaching experiences, gender, subjects, education degree etc. Proportion of the sample attributes are aligned with the proportion of the teachers in the schools. 150 questionnaires are separately allocated to five schools, it means each school takes 30.

Moreover, in the process of data collection which pertains to the present situation of the ICT applying, in spite of campus tour and investigation by the means of questionnaires, and another approach seeking information is through additional two questionnaires and in-deep interviews from the teachers.

For the aspect of the attitude and perception, data collection is mainly by the interviews. 5–10 persons are selected randomly, while some sample index as teaching subjects, sex, age and so on, which should be taken into consideration.

1.3 Data Collection

Questionnaires, visual and record along with the interviews, photos, all are the ways employed of collection. Need to say that all the audio-video record is accredited by the interviewees.

2 Data Analysis

Collection data took us more than three days, however, the great deal of hard work lied in how to analyse the data. We needed to clear the photos, the questionnaires, the notes of the interview; in fact, the hardest work was transition the audio, video into text. For example, one hour audio or video clip would take me ten hours to write down the words, and there would be more than 40,000 words.

2.1 Environment of School Educational Informatization

In this section, we focus on the environment of pilot schools information. I will analyse the basic information, their hardware, the digital educational resources and the software applied in the pilot schools.

2.1.1 Status of School ICT

It is revealed that school ICT teachers are less than presupposition and elder than the average, from the perspective of teacher body. As Fenghuang school, there are 4 ICT teachers, take up 3.3 % of the whole faculty and staff, nonetheless only one is under 35 years old compared with the others. Thus, it is conveyed that it's not easy for them to learn ICT if they are elder. On the other hand, all the ICT teachers are neither from the professional major of computer science nor education technology, while they are transferred from other positions due to the individual interests.

2.1.2 Hardware Environment

Study shows that all the classrooms of the 5 participant schools are the multi-media classrooms which are equipped with whiteboard and video presenter. Every school

has the separate computer room with 228 advanced computers, which occupies the 45 % of the total. Computers belong to teachers use only, there are 159 computers in the 5 schools. Fenghuang has 83 computers including 23 advanced ones, which take up 26.3 % of the whole. There are 159 computers for the staff use only of all the 5 participants, including 4 advanced, which is 6.9 % of the total.

Consequently, it is acknowledged that they have a plethora of computers, but old-fashioned. They reported that the high expenditure of maintenance is out of their reach, for the projector using frequently, bulb tired too fast to project clearly; for the whiteboard, touch site inaccuracy resulted from the long-time use, which made slow response, etc.

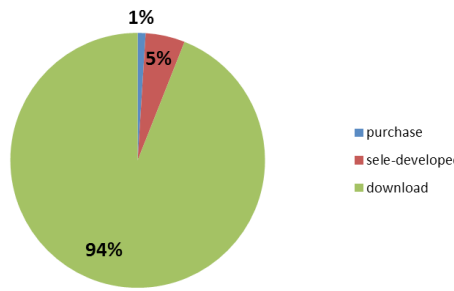
It can be conveyed that the 3 of the 5 schools have the server and computer wardrobe, whereas only 2 of them has the campus website, in which the information transmitting is limited. Therefore, the web construction is not as good as it is supposed to be, for 40 % of the total without campus website, while they only employed the basic function even with the access to the campus net.

Cardinal approach of transferring the message and information, campus website, facilitate teaching in the classrooms. It is seen that campus website plays the profound role in the education informatization process.

2.1.3 Resources

It can be described that computer applied of the 5 participants is all out of the internet, which means they can use Office software only. Moreover, plenty of resources which are used for teaching are available in the schools. Conversely compared with the usage for instruction, there is less for students use, such as Suishan lower secondary school with the database of 2G. Most resources of the participants are attributed to download, such as Shawan primary school usage more of download resources, see figure 3.1.

Figure 1
The Source of the Education Resources



Above all, it revealed the unbalance of the resources employment, actually there is less resources that can be shared with student, thus it is expected the development of the resources in the future.

2.1.4 Hard-Soft Ware

Computer-rooms are used with high frequency, for example, there are 102 computers in Fenghuang school which are used 1300 times, and each computer is used 12.7 times per week. Multi-Media classrooms are fully made use of, there are 115 classrooms in the 5 schools, which are used for 2545 classes per week.

Teachers are able to apply ICT in teaching, for example, preparation which is processed by PPT, editing of teaching plan, data searching, etc. and in the sense of homework and instruction, ICT is applied in research and homework revision. To some extent, ICT is permeated in the communication amongst teachers, students and parents, normally as QQ, Wechat and so on.

As the aspect of school management, only 1 of 5 own its management system, while ICT with the management as well as the QQ, Wechat, etc. However, ICT is completely employed in the tests statistic, which is covered by MS Office.

Accordingly, frequency of ICT usage is comparative high in 5 schools along with the frequently using by teachers, while which all are within the junior level of ICT.

2.2 Teachers' ICT Capacities

The survey used questionnaires to investigate the teachers' ICT capacities, including the usage of ordinary media, manipulation of computers, and ability of website operation, information searching and filter, 3 basic Office software comprehension, perceiving special curriculum software.

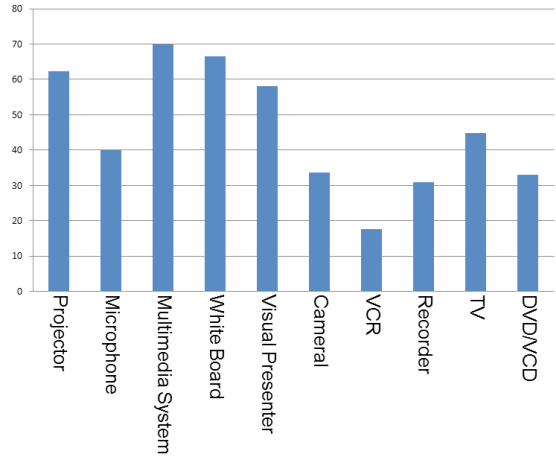
Questionnaires were sent to 2 primary schools (Shawan and Jianong primary school), 2 9-year obligatory schools (Fenghuang and Bishan schools) and 1 lower secondary school. Each school deserves to have 30. Proportion of sex, age and subjects which are of the indexes are deliberately attended among the participants during the survey. 143 questionnaires are allocated aligning with the returns, however, 142 are valid, and validity is 99.3 %. Data is processed by Excel.

Questions in the questionnaire contribute to 6 categories and 15 questions, they are constituted by the questions as follows. 2 questions for ordinary media usage, 6 questions are computer manipulation and special curriculum software apprehension, 3 questions refer to website and information searching and filter relevance, 2 questions posed on the attitude and perception of teachers, 1 question is about ICT capacities development of teachers.

2.2.1 Ordinary Media Usage

The question focuses on usage of conventional media by the primary and lower secondary schools' teachers. See figure 2.

Figure 2
Percentage of Skillfully Operate Conventional Device



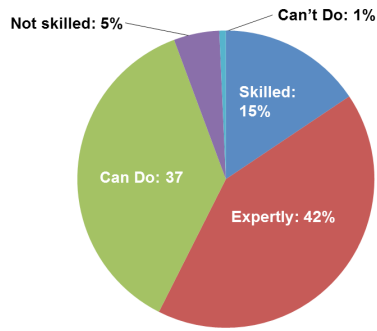
Statistics demonstrates that it's not a sufficient employment. Projector, multimedia system, whiteboard are comparatively well applied, multimedia utilization up to 69.9 %, video presenter is 58 %, which are all thanks to the promotion and popularization of multimedia system, but there is still need for further development. On the other hand, the utilization of microphone, camera, VCR, recorder, DVD player is not good, especially the worst of VCR, which refers to much reduction of conventional media employment.

What's more, it is portrayed that fewer teachers can use the media instruction system proficiently, on the other side, most of them are average users and even lower than average ones. There's no doubt that it need developing better and better.

2.2.2 Manipulation of Computer and Special Curriculum Software Apprehension

See figure 3 below.

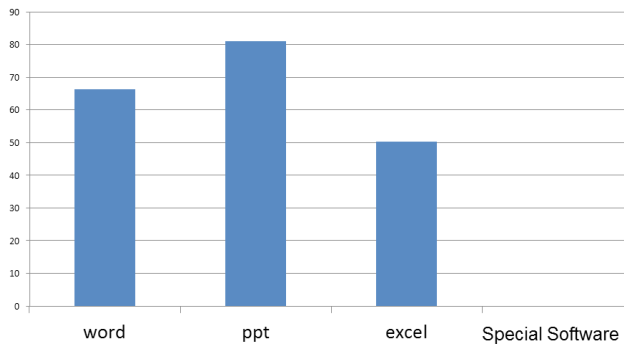
Figure 3
Basic Operation of Computer



It is revealed that the manipulation and control of computer and special software is under expectation. Proficient level and equivalence is 56.7 %, even though the basic manipulation of computer is the cornerstone of the teaching informatization and further education of informatization, nearly half of them evaluated themselves under the level of average.

See figure 3.4 for the frequently used software below.

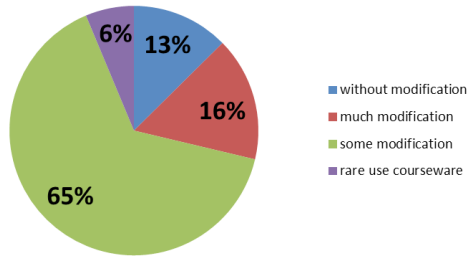
Figure 4
The Frequency of Use Software



Office software is the normal used one in teaching and learning of teachers, which reflect the degree of teachers' informatization straightforwardly. In addition, study statisticly showed that the comprehension of the special instruction software is zero.

See figure 3.5 which refers to the coherent courseware.

Figure 5
Percentages of Search Resources during Instruction

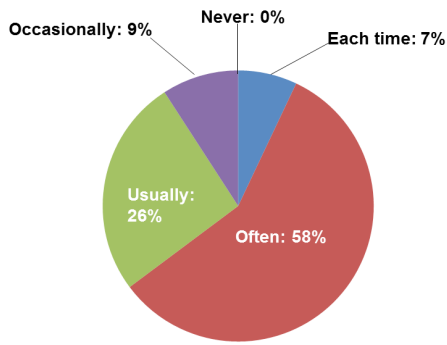


It is seen that most materials are used after some modification, while much more modification takes up 16.1 %, which is not too much. However, the proportion of without modification is up to 12.6 % indeed. All that mean that content, display and style of the multimedia courseware used by teachers are similar basically, and in other words, what belong to the idiosyncrasy of teachers turns less and less.

2.2.3 Website Utilization and Information Searching and Filter

Figure 6 is about web resources utilization, see below.

Figure 6
Web Resources Utilization



About 64 % of the teachers seeking information on-line in terms of the research statistics, and nearly 89 % teachers use internet searching information in work. It is implied that most teachers make use of the internet for pursuing education resources. Furthermore regarding the aspect of searching and filter of internet resources, 63.7 % teachers attained their goals of searching through the internet in the light of the data analysis, while the rest 36.3 % of the whole teachers are not able to download their resources successfully.

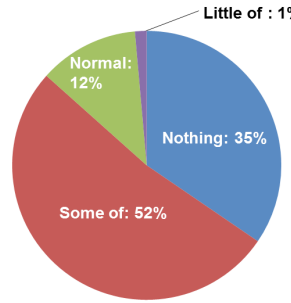
2.3 Perception and Attitude of Teachers towards ICT

Interviews are utilized to collect the data about the aspect of perception and attitude of teachers, in accordance with interviewees' permission, we use 3 different ways, taking down notes, VCR and audio record of collection. 5–10 persons were selected from each school accompanied with the consideration of teaching subjects, sex and age, etc. 29 persons were involved in the 8 times' interviews, especially ICT teachers from Shawan primary school, Biwhan and Fengwuang schools respectively, take the special interviews. Data of VCR and audio record converted into 20,000 words text, which is mainly about the content of the advantages and disadvantages of ICT using in their daily routine, what is need to improve and suggestions on the ICT skill training for school teachers.

2.3.1 Attitude towards ICT in Education

26 out of 29 interviewees are positive in utilization of ICT and ordinary media, they thought it is intuitive and easy, as figure 3.7 demonstrated. Mathematics teachers prefer graphic technology of multimedia. As Teacher Lian from Bishan school put it, "Through the graphic technology, problems about symmetry axis, parallel to the rotation, strong model of 3-Dimension, reflection of the shadow and so on are all well in use." Chinese and English teachers thought it helps the context construction be smoothly, as which is mentioned by Chinese Teacher Zhao of Fenghuang school, students read the text with the music that is downloaded from the internet; English Teacher Ji said that the prominent advantage of the multimedia was expressed on the repeat and pronunciation; Chemistry Teacher Li said three advantages of ICT in chemistry teaching, first is about intriguing students by display something normal in reality, secondly it can transfer microscopic process of the molecule and atom into macroscopic one, thirdly it can be present easily for the dangerous experiment by simulation on video.

Figure 7
The Significance of ICT in Education



Conversely, part of them mentioned the aspect of disadvantages, such as the information is too rich to grasp the point for students, and it is too fast to remember, even without making deep thinking. Especially, most of them were worried about students' vision, which was influenced by long time looking at whiteboard. For example, Teacher An of Jianong primary school said that she was taking some negative attitude towards the multimedia, she thought that students looked at the whiteboard all the day while they cannot get a rest if they continue to watch the TV after school, which did harm to their vision. Additionally, Chinese Teacher Yu thought it really has uses but not many, esp. for Chinese learning, courseware as PPT can stifle the imagination of students. Mathematics Teacher also agreed that students were all too concentrated on the courseware to think by themselves, esp. for deviation in mathematics, to some extent that students were just waiting for the spontaneous result without any insightful exploration and thinking.

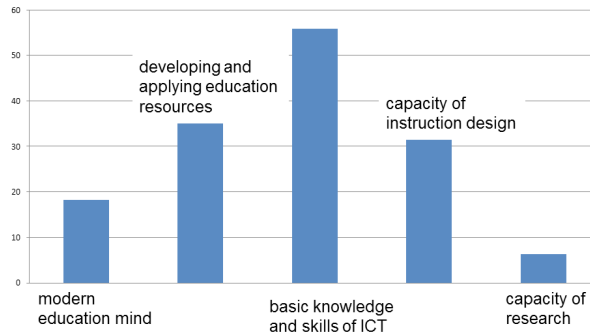
Whatever positive or negative attitude towards ICT, the point is that teachers use ICT frequently including ordinary multimedia, as Fine Arts Teacher Li of Shawan primary school said that all the classes were conducted with computer and whiteboard except physical education. Teachers search relevant materials from the internet or coherent e-resources before class, furthermore two-thirds of teachers use the material in class after their modification.

2.3.2 ICT Training

Interviewees talked less on this issue. However, firstly they all had the will to take part in the ICT training program, even 3 of them over 50 years old still want to be involved (Tang q., 2015). In addition, most teachers haven't defined the content of ICT training, only 2 mathematics teachers mentioned the operation of the sketchpad, as figure 3.8 displayed. Thirdly, they wish it is school-based training, which is easy for them to

balance learning and working and expanding benefits. Chinese Teacher Zhou from Shawan primary school said: "I don't like to attend the training outside when I am teaching, I cannot focus on the training because of worrying about my students. Moreover, the schedule of training should be flexible, especially not during the weekends. The content of the training shouldn't be too much and complicated as such, it is better of one theme per time for me."

Figure 8
The Percentage of Training Content



3 Conclusion

Based on the analysis detail above, we will draw some conclusions. According to the aim of the investigation and our analysis, we can acquire some results related to the hardware and software environment, the teachers' ICT capabilities, and the attitude and awareness in the pilot schools.

3.1 Hardware Environment

Each school in Shawan district has an access to 20–50 optical broadband which accomplished campus website coverage system, along with 341 each-class-available-resources-33 computers rooms, 27 e-classrooms for preparation lessons, 9 multimedia classrooms based on subarea, 4 active PR classrooms, 23 systems of laboratory management, 23 types of campus easy radios and 40 LED displays.

While part of the equipment is worn out, for instance, inaccurate positioning of whiteboard, old used light bulb of the projector, frequent crashing of computer when

recording micro-lecture. Indeed, the effect of focus and light of the video presenter is not good enough; some problems of switching signal on the controller in the multimedia classrooms are raised, which demonstrated that teachers would rather control presenter by computers; as for the LED whiteboard, 65 inches' is not big enough within the reach of more than 50 students, students at the back cannot see it clearly.

3.2 Software Environment

Most schools share the resources through the collective preparation lessons, that are fabulous, whatever the resources from collection or self-developed, which are shared together. As the reference CDs are well applied by music and mathematics teachers.

However, national basic education repository and other resources from the internet are not compatible with teaching perfectly, although they are rich while not appropriate, and some of them are no match to the teaching materials. Actually, regional educational repository is developing in Shawan District at the beginning, while teachers have strong urge to pursue appropriate resources for teaching. Situation of building and utilization of campus website is not optimistic as well, which will affect sharing resources and posting information.

3.3 ICT Capacities of Teachers

Teachers had a good command of the ordinary media, esp. basic computer operation, they often utilized multimedia for teaching, most teachers got resources through the function of searching and filter, most teachers applied the download resources into teaching after modification, and part of teachers can develop their own courseware for class.

As for instruction media whiteboard, they are regarded as displayer devices and are not full used their profound functions. The teachers can't coordinately or skillfully operate the traditional instruction media, even can't operate at all. They rarely analyze data with simple software for example MS-Excel, many of them only can calculate Average, Sum, and the peak. However, the relationship-analysis or the regression-analysis is not heard at all.

3.4 The Attitude and Awareness about ICT

Nearly all teachers think that the role of ICT is very important in education, and their workload is decreased by ICT, and students' interest is enhanced. Multimedia can help context construction smoothly, and transition microcosmic into macroscopic (MoE of China, 2014). The teachers have strong interest in ICT and hope to attend trainings to continue study more skills of ICT.

On the other hand, many teachers worry about their students' eye-sight affected for widely using whiteboard in every school, even in every class from morning to evening. Some teachers think that widely used ICT can be used as a simulation that will affect or even kill student's imagination, and over depend on the ICT will make the student too idle to think. Some teachers think knowledge is too much to understand in so short time, and the knowledge is displayed too soon to understand clearly the process.

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References

Tang Qianjun. (2015). A Report of Survey Analysis the Primary and Middle School Teachers' Information Technology Application Ability. Journal of Leshan Normal University, 2015(02): 136–140.

Ministry of Education. (2014). China. *The Criteria of Application ICT for Middle School and Primary School Teacher.*

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Accessibility of Digital Platforms at Universities for Students with Visual Impairment and Blindness

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Abstract

The aim of this paper is to define selected key determinants of accessibility of a digital platform in tertiary education of students with several visual impairments. In the context of tertiary education, it deals with important aspects of the use of semantic HTML tags and elements which to describe an electronic document in an accessible and structured form. We observed the theoretical as well as practical scopes of the use of selected semantical HTML tags for headings and lists from the point of view of blind students. The paper separately elaborates issues related to the implementation of the WAI-ARIA 1.0 landmarks into HTML 5 specification. We conclude through the means of combined qualitative and quantitative research that the accessibility level of digital platforms of universities is unsatisfactory. 63% of universities did not use correct headings and lists in their digital platforms in 2015, and we did not find a single institution which would be fully compliant with the WAI-ARIA landmarks.

Keywords: digital platform, e-Accessibility, visual impairment, blindness, tertiary education, HTML, HTML 5, WAI-ARIA.

Introduction

Digitalization of educational and information processes at universities represents a cornerstone of innovative, creative and dynamic education. The proportion of digital tools and digitally shared information is gradually increasing. The implementation of modern technologies to educational processes also increases requirements for technical support in line with digital accessibility requirements. These new tools represent threats as well as opportunities for securing equal access to information and for promoting equal opportunities for visually impaired students, including the implementation of effective anti-discriminatory measures. It is an institution that facilitates the education process (e.g. university), responsible for creating a digital environment compliant with requirements of universal design and the principles of inclusion, thus creating a digital platform that can facilitate academic training and associated services equally for all students, with or without impairment.

In the presented paper we will describe in detail key determinants of accessibility to a digital platform in tertiary education for students with visual impairment where the term digital platform encompasses all digital information, IT services, learning and communication environments a university provides to its students, faculty and related communities. A digital platform includes but is not limited to academic and information systems, digital admissions, student services, learning and course management systems including their content, digital library, library systems and catalogues (OPAC), communication and collaborative environments used in educational processes, other related services and tools for digital data management used in the academic environment.

Chapters are supplemented with data from a combined qualitative-quantitative research conducted throughout year 2015 (for in-depth review of the methodology see Regec 2014; 2015a; 2015b; 2015c). the research sample consisted of 106 universities and higher education institutions (e.g. colleges, for simplicity all are further referred to as universities) in the Czech Republic and Slovakia divided into the following categories:

1. Public universities in the Czech Republic ($n^{CzPublic} = 26$);
2. State universities in the Czech Republic ($n^{CzState} = 2$);
3. Private universities in the Czech Republic ($n^{CzPrivate} = 43$);
4. Public universities in the Slovak Republic ($n^{SkPublic} = 20$);
5. State universities in the Slovak Republic ($n^{SkState} = 3$);
6. Private universities in the Slovak Republic ($n^{SkPrivate} = 12$).

As part of the conducted research we investigated whether the electronic platforms of the sampled universities adheres to the rules defined by the guidelines, methodologies and standards at the national and international levels. Following are the key documents that create the locally enforced legal framework as well as provide checkpoints and useful guides which were used for the evaluation:

- Methodological instruction to Decree No. 64/2008 Coll.
- Annex No. 1 to Edict No. 55/2014 Coll., on standards for public administration information systems
- Blind Friendly Web 2.3
- Web Accessibility Initiative – Accessible Rich Internet Applications (WAI-ARIA) 1.0
- Web Content Accessibility Guidelines (WCAG) 1.0
- Web Content Accessibility Guidelines (WCAG) 2.0

1 Accessibility of digital platforms with the use of the WAI-ARIA landmarks and HTML 5 sections

WAI-ARIA is a technical specification implemented by the World Wide Web Consortium (W3C) in 2014 that introduces tools, guidelines and practices how to increase the accessibility and interoperability of web pages with the focus on dynamic content and user interface components developed with JavaScript, Ajax and related technologies. "Specification provides an ontology of roles, states, and properties that define accessible user interface elements…" (Craig & Cooper, 2014). The ARIA elements do not interfere with user-agents that do not support them, so adding ARIA to a digital platform does not affect any backward compatibility or limit rich internet applications in any way.

ARIA is based on a role model. Roles are elements with specific pre-defined sets of values that describe their function, semantic level or relation. The value of the role associated with an element must not be changed over time or with user actions. User agents (web browsers, screen readers) can read the roles and use them for effectively operating and navigating rich content and applications using assistive technologies.

Roles are categorized into the following groups:

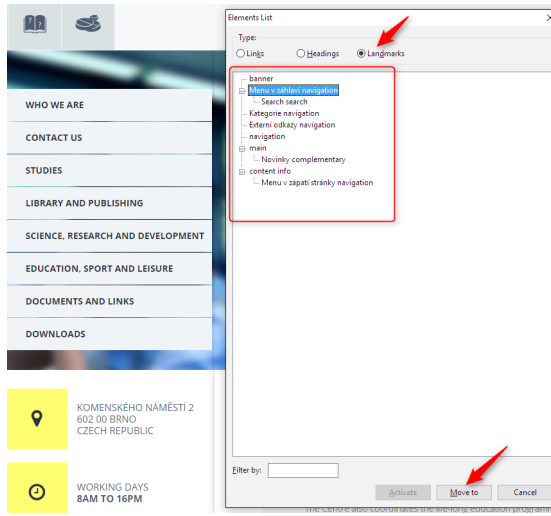
1. **Abstract roles** are used to support WAI-ARIA role taxonomy and define general concepts they are not used in the content.
2. **Widget roles** are used to define and operate a user interface.
3. **Document structure roles** describe structures that organize content in a page. They are an extension of document structure tags defined in the HTML 5 specification, which are explained in detail below and are not interactive.
4. **Landmark roles** extend the HTML 5 navigation and describe semantically individual regions of a displayed webpage or application. The correct use of the landmark roles was primary focus of the conducted research.

The landmark roles significantly improve the accessibility of digital documents for users with disabilities by uniquely identifying individual parts of the contents (header, main menu/navigation, main content, footer, etc.). Landmark roles include:

- role="**application**" (denotes a region declared as web application, in contrast with web document; user-agents should alter their behaviour respectively, especially when handling keyboard shortcuts);
- role="**banner**" (for site-oriented rather than page-specific content);
- role="**complementary**" (supporting sections of the main document at the same hierarchy level that remains meaningful even when separated from the main content);
- role="**contentinfo**" (usually for copyright and privacy statements, contains information about the parent document);
- role="**form**" (navigational landmark denoting a region containing an object that as a whole create a form);
- role="**main**" (main content of a document);
- role="**navigation**" (a collection of navigational elements (usually links) for navigating the document or related documents);
- role="**search**" (related to a form, this is the only case when a form represents a search facility).

It goes without saying that a well organized, hierarchical and semantically marked document can improve comprehension for both visually impaired and intact users. With the help of well-defined reference points using the ARIA landmarks in a digital document, website or application, assistive technology can identify individual parts of the structure, relations between them and their respective functions, and provide its user with an accurate, hierarchically organized document overview. Furthermore, it usually gives the impaired user means of effective navigation between individual parts, better control of an application and minimizes the risk of "getting lost" in complex documents or sites which are frequently present in the academic environment.

Figure 1
Landmarks from the website of the Support Centre for Students with Special Needs Teiresias at Masaryk University displayed in a tree-form with the free NVDA screen reader from NV Access[1,2]



The Teiresias centre also utilizes special labels (aria-label) that further refine the meaning of particular areas for the assistive technology. For example, the string "Menu in the header" defines the type and the location of the navigation panel. Passing this information to the assistive technology and subsequently to its user leads to faster orientation on a yet unfamiliar site.

-

With the finalization of HTML 5 in 2014, new semantic elements were implemented and the rest became ARIA-aware because now practically every HTML element can have an ARIA role attribute specified. Tags used in the new HTML 5 semantics to define different parts of a webpage correlate with the WAI-ARIA landmarks (see Tab. 1).

The list of the HTML 5 semantic elements includes: <article>; <aside>; <details>; <figcaption>; <figure>; <footer>; <header>; <main>; <mark>; <nav>; <section>; <summary>; <time>.

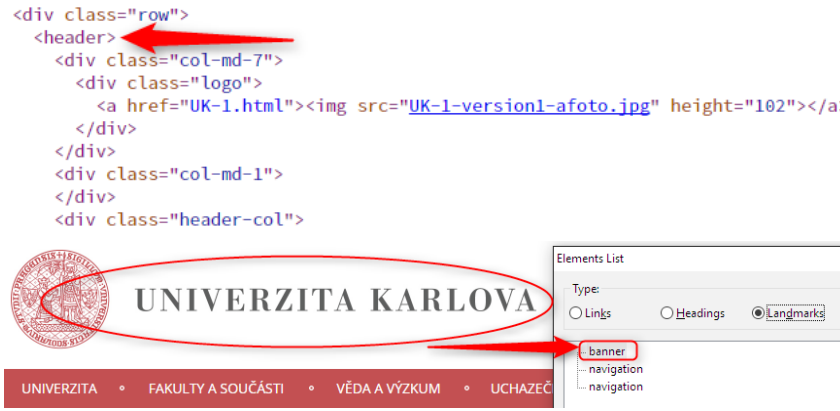
[1] https://www.teiresias.muni.cz/

[2] http://www.nvaccess.org/

According to the research by Ibanescu (2011), screen readers JAWS and NVDA were unable to interpret sections defined by the then upcoming HTML 5 standard. However, that is no longer the case. During our own research conducted in 2015, both the screen readers did interpret HTML sections as landmarks correctly (Fig. 2).

Figure 2

The semantic HTML 5 element <header> recognized as a "banner" landmark by the NVDA screen reader at the home page of Charles University[3].



One of the frequently encountered problems in practise is the correct concurrent use of the HTML 5 semantic tags (also referred as sections) with the WAI-ARIA 1.0 landmarks.

Figure 3

[3] http://cuni.cz/

Because of the suboptimal use of a <nav> element, the assistive technology marks the footer area as navigation. In the end it is also confusing for users as there are two different sections identically marked navigations now. The NVDA screen reader parsing the homepage of the Charles University website.[4]

Table 1
Selected semantic elements in the HTML 5 speci cation and corresponding WAI-ARIA 1.0 landmarks.

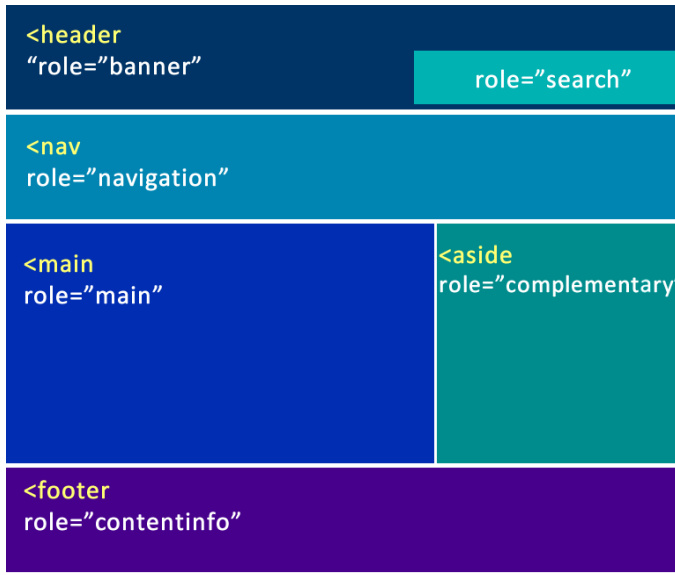
HTML 5 semantic tags	WAI-ARIA landmarks
<header>	role="banner"
<nav>	role="navigation"
<main>	role="main"
<footer>	role="contentinfo"
<aside>	role="complementary"
–	role="search"
<form>	role="form"

To clear the confusion between the WAI-ARIA landmarks and their HTML 5 related elements, we propose the following best-practices model of their application to basic webpage areas (Fig. 4).

- **HTML element <header>** should be assigned an ARIA role="banner". This section can include a specific form with role="search", typically used for a site-wide search function.
- **HTML element <nav>** should be assigned ARIA role="navigation" in the case of global navigation. Property "aria-label" should be further used to distinguish between global navigation of the site and local navigation within the displayed document. For example: <nav role="navigation" aria-label="Site navigation"> for global navigational structure and <nav role="navigation" aria-label="Chapters"> for local navigation within the displayed document. Furthermore, local navigational <nav> can be enclosed with the <aside> tag that, however, does not remove the requirement to use an "aria-label".
- **HTML element <main>** should be assigned the ARIA role="main".
- **HTML element <aside>** should be assigned the ARIA role="complementary".
- **HTML element <footer>** should be assigned the ARIA role="contentinfo".

[4] http://cuni.cz/

Figure 4
Semantical model of a simple webpage divided into areas with the use of the HTML 5 semantic tags and corresponding WAI-ARIA landmarks



2 Accessibility of a digital platform and the use of the semantic HTML tags for headings

Legal framework and standards related to this section:
- WCAG 1.0 > Checkpoint: 3.5 (Priority 2).
- WCAG 2.0 > Success criteria: 1.3.1 (Level A); 2.4.6 (Level AA); 4.1.1 (Level A).
- Blind Friendly Web 2.3 > Rule: 13.
- Methodological instruction to Decree No. 64/2008 Coll. > Rules: 26; 29.
- Annex No. 1 to Edict No. 55/2014 Coll., on standards for public administration information systems > Point 3.5.

In relation to the above stated checkpoint, we investigated in the conducted research whether the structure of the documents presented within the digital platform of the universities is defined through header elements and whether they are used according their specifications. Besides web and internet application environments (HTML/XHTML

files), we have also evaluated semantic structures of other documents publicly available for download from the universities' websites as well as selected publicly accessible study materials. Most of these documents were in the PDF, DOC, DOCX and RTF file formats.

Well defined headings play a key role for correct comprehension of the semantics and structure of a document for users with severe visual impairment (Regec, 2014). Accessibility violations were evaluated and assigned one of three categories during the analysis:

1. **Satisfactory/no violation**
   - Used technologies do not reduce accessibility for visually impaired and blind users.
2. **Moderate violation**
   - The accessibility is moderately affected. ilt can mean in this context that guidelines are followed but inconsistently, or the semantic structure is not always clear or applied according to its purpose (e.g. some of the heading levels are skipped or incorrectly applied). In general, users are able to accomplish the task despite some difficulties.
3. **Severe (significant) violation**
   - Information is inaccessible or incomprehensible. It means in this context that the semantic structure of a document is incomprehensible or not defined at all or defined in a way that cannot be relayed to visually impaired users through their assistive technology.

63 % of universities in the Czech and Slovak Republics did not use correctly applied headings in their digital documents to create a semantic structure in the year 2015. However, the violation was severe only in 10 % of the universities. Differences between the Czech Republic and Slovakia are insignificant, with the exception of the Czech Republic having slightly higher (3.7%) proportion of the schools with correctly defined semantical structures.

Figure 5. Evaluation of the accessibility of the digital platforms of the universities in the Czech Republic and Slovakia. Proportions in % of the universities according to their accessibility level in the field of semantically structured documents (application of headings) in 2015 (n = 106).
Key: V = severe violation; MP = moderate violation; V = satisfactory/no violation

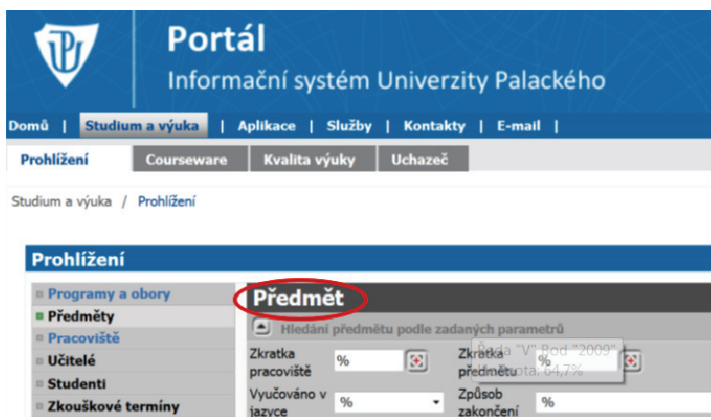
Overall, 36.8% from all 106 evaluated universities used well defined headings in their digital platforms (Tab. 2). Nearly a half of the Slovak public universities and Czech private universities had titles defined in an accessible form. In contrast, two out of three state universities in Slovakia had their digital information in a form inaccessible for visually impaired students.

Table 2
Findings in the area of a proper use of headings and semantically structured documents on digital platforms at universities in the Czech Republic and Slovakia in year 2015 (n = 106)

	CZ Public		SK Public		CZ State		SK State		CZ Private		SK Private	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
V	8	30.8	9	45.0	0	0.0	0	0.0	19	44.2	3	25.0
MP	15	57.7	10	50.0	2	100.0	1	33.3	20	46.5	8	66.7
VP	3	11.5	1	5.0	0	0.0	2	66.7	4	9.3	1	8.3
Σ	26	100.0	20	100.0	2	100.0	3	100.0	43	100.0	12	100.0

The most prevalent accessibility violation was in the form in an incorrect use of headers <h1> to <h6> for titles in the source code of the universities' websites. One of the examples of such a case where headers are missing completely can be seen at Fig. 6, which depicts a screenshot from the academic information system of Palacký University Olomouc, currently also used at other universities across the Czech Republic.

Figure 6
Visually styled heading that is inaccessible as a title for assistive technologies. (Academic information system of Palacký University Olomouc[5])



Related line in the source code used for the title ***Předmět***:

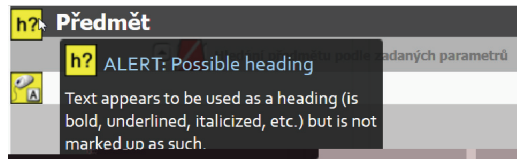
- Předmět

[5] https://portal.upol.cz/wps/portal/StudyingAndTeaching.

The code above is completely avoiding any semantic tags and its custom class is undetectable with assistive technologies. In this case the cause of violation can be described as not using header elements <h1>..<h6> according to their specification.

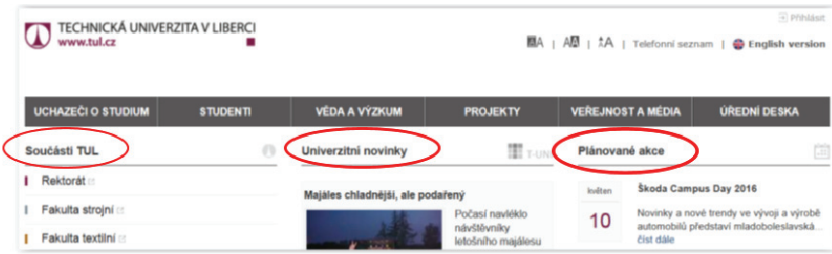
Automated analytical tools can also provide helpful feedback to detected accessibility violation described above. Fig. 7. shows a free "WAVE web accessibility evaluation tool" reporting alert of a possible heading not being properly semantically marked.

Figure 7
Alert of a potential digital barrier caused by a possible heading not semantically marked, reported by the automated WAVE – web accessibility evaluation tool.[6]



Another example of visually represented titles without a proper semantic markup in the source code can be found at Technical University of Liberec (Fig. 8). These titles are invisible for navigation tools of the assistive technologies. In the source code, we can see that a custom class "header" is solely used instead of semantic heading tag <h1>..<h6> for the purpose of the eCSS formatting.

Figure 8
Titles presented visually but without a proper semantic markup at Technical University of Liberec[7]



[6] http://wave.webaim.org/

[7] http://www.tul.cz/

```
</div>

<div class="column columns-four controlcolumn uni-news">
    <div class="header">Univerzitní novinky</div>

        <li class="news-item"><div class="title">Majáles cl
            <p><img class="news-image" src="http://tuni.tu
            Počasí navléklo návštěvníky letošního majálesu
            <div class="clearfix"></div>
```

3 Accessibility of a digital platform and the use of the semantic HTML tags for lists

Legal framework and standards related to this section:

- WCAG 1.0 > Checkpoint: 3.6 (Priority 2).
- WCAG 2.0 > Success criteria: 1.3.1 (Level A); 4.1.1 (Level A).
- Blind Friendly Web 2.3 > Rule: 13.
- Methodological instruction to Decree No. 64/2008 Coll. > Rules: 26; 29.
- Annex No. 1 to Edict No. 55/2014 Coll., on standards for public administration information systems > Point: 3.6.

Along with the properly semantically marked titles, well-formed and hierarchically structured links are essential for enabling students with severe visual impairment or blindness to comprehensively and effectively navigate a website, application or digital document.

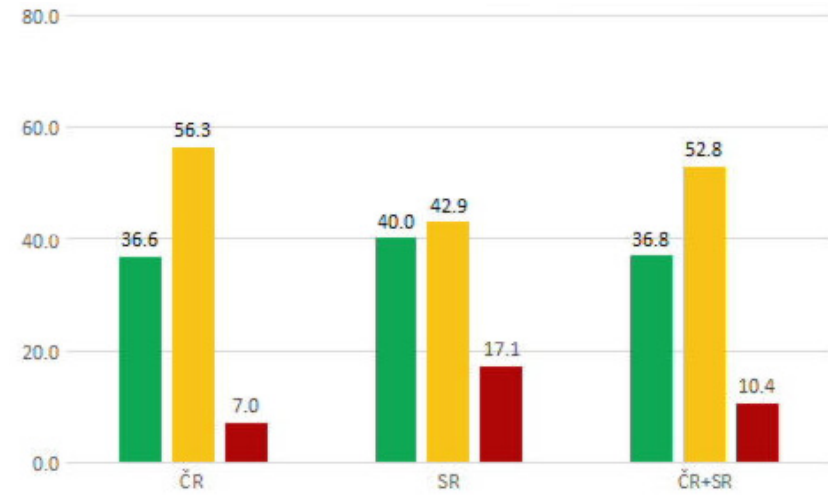
During the research period of 2015, our focus in the field of links was primarily on evaluation of the proper placing and form of site-map and global navigation. Hierarchically structured elements are required in both the cases in order to form a site with navigation accessible and operable by the assistive technologies and their users, especially those using screen readers.

Accessibility violations were evaluated and assigned one of three categories during the analysis:

1. **Satisfactory/no violation**
    - The used technologies do not reduce the accessibility for visually impaired and blind users. It may mean in this context that regions containing navigation are properly marked using a <nav> tag and/or ARIA landmark, and individual elements are properly hierarchically structured.

2. **Moderate violation**
   - The accessibility is moderately affected. Navigation might be missing a semantic <nav> tag or ARIA role="navigation" landmark, but navigation is still executed through the links organized in a structured way that is accessible.
3. **Severe (significant) violation**
   - Information is inaccessible or incomprehensible. It means in this context that a sitemap is missing, and/or global navigation is not organized in a list at all. Blind users are unable to navigate the site without assistance.

Figure 9



Evaluation of the accessibility of digital platforms of the universities in the Czech Republic and Slovakia. Proportions in % of universities according to their accessibility level in the field of hierarchically structured lists (applied to global navigation and site-map) in 2015 (n = 106).
Key: V = severe violation; MP = moderate violation; V = satisfactory/no violation

While not using semantically marked titles in a document or site properly may lead to information being incomprehensible, difficult to retrieve and hard to work with, a wrongly designed navigation section often means that users most likely will not be able to reach desired information at all.

Our research marginally showed better results in the group of universities that had met criteria for the lists as compared with the accessibility situation in the field of the

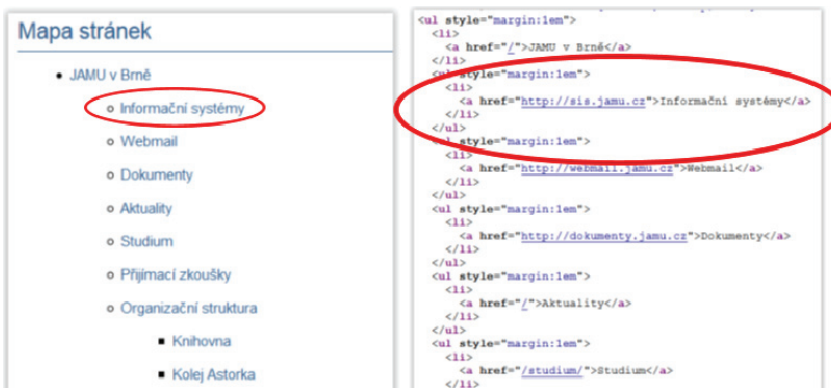
semantically correct use of headings. Best results were observed at private universities (58.3% satisfactory levels), and vice versa, the highest proportion of severe violations was recorded at state universities (Tab. 3).

Table 3
Evaluation of the accessibility in the area of structured lists (navigation) at universities in the Czech Republic and Slovakia in year 2016 (n = 106)

	CZ Public		SK Public		CZ State		SK State		CZ Private		SK Private	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
V	7	26.92	6	30.0	0	0.0	1	33.33	19	44.19	7	58.33
MP	14	53.85	12	60.0	2	100.0	0	0.00	24	55.81	3	25.00
VP	5	19.23	2	10.0	0	0.0	2	66.67	0	0.00	2	16.67
Σ	26	100.00	20	100.0	2	100.0	3	100.00	43	100.0	12	100.00

Fig. 10 shows the example of not properly structured list elements forming a site map. Elements are structured with indentation using the inline CSS style attribute, however semantically all of them are at the same level, thus providing different experience to intact vs. visually impaired users who cannot perceive the information about hierarchy unless it is properly defined.

Figure 10
Incorrectly formed site map at Janáček Academy of Music and Performing Arts in Brno. Despite the fact that an unordered list is used, it is missing a hierarchical structure[8].



[8] http://www.jamu.cz/sitemap.html.

Another common mistake is often present when a webpage has more navigational regions, such as global and local navigation, a list of external links. Better description should be used when labelling these so that users do not end up presented with three different top level regions marked simply as "navigation".

Conclusion

Our research conducted in 2015 in the Czech and Slovak Republics showed that only about one-third of the evaluated universities (n = 106) has their digital platforms accessible at a satisfactory level, and about 10 percent has their digital content inaccessible by blind users. Despite being adopted more than two years ago, the ARIA landmarks and HTML5 semantic tags are not used by universities or are often used incorrectly. The present situation is also a violation of good but weakly enforced legislation; nonetheless universities should wake up and boost their accessibility efforts before it will be too late.

Mitigation of this unfavourable state is relatively easy and not costly. The structure of regions of a website can be easily adjusted by making corrections to the templates. Navigation and site maps are regions often generated automatically and repeated everywhere, so one correction can instantly fix the entire site. The HTML5 semantic elements and WAI-ARIA landmarks offer simple, backwards compatible solutions that provide great comfort to visually impaired users while not affecting the experience in any way for anybody else.

Digitalization is a great opportunity to support participation and quality services and content delivery to students with visual impairment, however currently it still presents a significant digital barrier. The situation needs to be monitored and evaluated and properly communicated with the management, together with other aspects of the accessibility of the digital platforms of the universities and together with proposed solutions developed and verified with the participation of end-users.

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References

Caldwell, B., Cooper, M., Guarino Reid, L., & Vanderheiden, G. (2008). *Web Content Accessibility Guidelines (WCAG) 2.0.* Retrieved from https://www.w3.org/TR/WCAG20/.

Center for History and New Media. (n.d.). Rýchly sprievodca. Retrieved from http://zotero.org/support/quick_start_guide.

Chisholm, W., Vanderheiden, G., & Jacobs, I. (Eds.). (1999). *Web Content Accessibility Guidelines 1.0.* Retrieved from https://www.w3.org/TR/WCAG10/.

Craig, J., & Cooper, M. (Eds.). (2014). *Accessible Rich Internet Applications (WAI-ARIA) 1.0.* Retrieved from https://www.w3.org/TR/wai-aria/.

Hickson, I., Berjon, R., Faulkner, S., Leithead, T., Doyle Navara, E., O'Connor, E., & Pfeiffer, S. (Eds.). (2014). *HTML5.* Retrieved from https://www.w3.org/TR/html5/.

Ibanescu, L. (2011). *How Screen Readers Speak A Page With HTML5 and ARIA.* Retrieved from: <http://cssgallery.info/how-screen-readers-speak-a-page-with-html5-and-aria/>.

Ministerstvo financií Slovenskej republiky. (2014). Výnos č. 55/2014 Z. z. Výnos Ministerstva financií Slovenskej republiky o štandardoch pre informačné systémy verejnej správy. Retrieved from: http://www.epi.sk/zz/2014-55.

Ministerstvo vnitra České republiky. (2008). Metodický pokyn k vyhlášce č. 64/2008 Sb., o formě uveřejňování informací souvisejících s výkonem veřejné správy prostřednictvím webových stránek pro osoby se zdravotním postižením (vyhláška o přístupnosti). Retrieved from: http://www.mvcr.cz/clanek/metodicky-pokyn-k-vyhlasce-c-64-2008-sb-o-forme-uverejnovani-informaci-souvisejicich-s-vykonem-verejne-spravy-prostrednictvim-webovych-stranek-pro-osoby-se-zdravotnim-postizenim-vyhlaska-o-pristupnosti.aspx.

NV Access. (2016). NVDA screen reader (Version 2016.4). Queensland: NV Access. Retrieved from: http://www.nvaccess.org/.

Pavlíček, R. (2005). *Blind Friendly Web.* Retrieved from: http://blindfriendly.cz/download/doc/bfw23.pdf

Regec, V. (2014) Visual Impairment and Digital Barriers at University and College Web Portals. In *8th International Technology, Education and Development Conference. INTED2014 Proceedings.* Valencia, pp. 3533–3539.

Regec, V. (2015a) Comparison of Automatic, Manual and Real User Experience Based Testing of Accessibility of Web Sites for Persons with Visual Impairment. *Journal of Exceptional People. 3*, 1.

Regec, V. (2015b). e-Accessibility in Educating Students with Visual Impairment. In *8th International Conference of Education, Research and Innovation, ICERI2015 Proceedings.* pp. 4369–4374.

Regec, V. (2015c). Evaluation of Determinants of E-Accessibility In the Context of Visual Impairment. In *2nd International Multidisciplinary Scienti c Conference on Social Sciences and Arts SGEM2015, 2015.* pp. 399–406.

Smith, J., & Whiting, J. (2016). *WAVE – web accessibility evaluation tool*. WebAIM (Web Accessibility In Mind). Retrieved from: http://wave.webaim.org/.

W3C. (2016). How to Meet WCAG 2.0.

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Attitudes of Social Workers to Complementary and Alternative Methods of Interventions for Children with Autism in Kerala, India

Tomáš Hudec, Stanislava Ševčíková

Abstract

The authors present the topic of professional social workers and social pedagogues' attitudes and practice towards complementary (healthcare, psychotherapy, special education) and alternative (ayurveda, homeopathy, music therapy, yoga, meditation) medicine for children with autism spectrum disorders in Indian Kerala. Field research was conducted directly in the Indian state of Kerala with professional social workers using a qualitative research strategy in the form of semi-structured interviews. The aim of the study was to gain better understanding of the cultural context and specific features of psychiatric social work in India.

Keywords: Attitude – Autism – Complementary methods – Alternative methods – Social Work – Social Pedagogy.

Postoje sociálních pracovníků ke komplementárním a alternativním metodám intervence dětí s autismem v Kerale, Indie

Abstrakt

Autoři prezentují problematiku postojů a praxe profesionálních sociálních pracovníků a sociálních pedagogů ke komplementární (psychoterapie, speciální pedagogika) a alternativní medicíně (ajurvéda, homeopatie, terapie hudbou, jóga, meditace) s dětmi s autismem v indické Kerale. Výzkum byl realizován přímo v indické Kerale s profesionálními sociálními pracovníky kvalitativní výzkumnou strategií formou polostrukturovaných rozhovorů. Cílem studie je získat lepší porozumění kulturního kontextu a specifických rysů psychiatrické sociální práce v Indii.

Klíčová slova: Postoj – Autismus – Komplementární metody – Alternativní metody – Sociální práce – Sociální pedagogika.

Introduction

As the pace of new knowledge accelerates in many disciplines of present-day society (Ferguson, 2003), traditional systems face a need to respond to new challenges, which involves the need also to cope with a certain degree of risk (cf. Beck and Beck-Gernsheim 1996, Ševčíková, Navrátil, 2010). In the presented study we interview social workers operating in the Indian state of Kerala in order to find out how social workers view traditional systems of complementary and alternative medicine in addressing autism and children's autistic manifestations. Happé (1995) assume that autistic manifestations are present across our civilisation despite the fact that they may never have been diagnosed by doctors and professionally addressed, especially where social services and healthcare are not accesible for the whole population.

The authors first conceptualise the basic notions in the particular culture, and continue by defining autism spectrum disorders as well as the concept of family, complementary and alternative medicine, and, last but not least, social work. We shall subsequently present the applied research methodology and provide an interpretation of the data obtained through the presented qualitative research among social workers in Kerala, India.

Culture

The present work represents a cross-cultural study, and therefore the authors begin by defining culture. The generally accepted concept by Grewal (2010) and Geertz (2000) considers culture as a shared system of meanings, and these meanings channel the behaviour of all members of a culture group. Murphy (1986) states that for culture to exist, the human brain must be able to generalise and arrange the perceived categories into meaningful units. According to White (in Murphy, 1986), human culture is a set of symbolic acts. For old customs and symbols to be reflected and new possibilities to be allowed to enter an original culture, a certain amount of "mental flexibility" is required (cf. Murphy, 1986). Some authors, including Mamtani (2011) believe that in mental health matters, these meanings influence the way we perceive and intervene in a mental disorder, and this subsequently influences how the disorder develops in its cultural settings. Mamtani (2011) uses the term *universalist* approach, whereas some other approaches regard mental illness as a purely social construct or rather the opposite, a biological disease with uniform symptoms and manifestations across the world.

Autism spectrum disorders

Autism spectrum disorders (hereinafter ASD) have been studied in a similar way by anthropology. Grinker (2007) makes the distinction that ASD as a disorder (the physical structure of the brain and behavioural patterns) is universal, while as an illness it is culturally constructed (the set of symptoms perceived as pathological or strange). Western social science reaches the same conclusions in the work of Eyal (2010). In his work he shows the changing cultural perception of ASD in the history of Western psychiatry and social services.

Family

Present-day family is described as the process in which the members of a family construct the perception of their roles (Baviskar, 2010). The Indian family shows certain specific cultural features, the extended family in India is a "joint family", with joint obligations, joint estates and subordination of the individual to family interests (Henderson, 2002, Sharma, 2007). Other characteristics are strong religious and caste affiliations. Another aspect of the Indian family, *izzat*, i.e. maintaining the reputation of one's family, has specific implications for people's conduct towards the mentally ill, and the overall

importance of family life for Indians has implications not only in the care provided by the family but also in the Indian *healthcare and social care sectors (Juthani, 2001)*.[1]

In India, a family with a member with ASD is affected very strongly. Family pride suffers with the breaking of numerous social rules in everyday situations (Grewal, 2010). According to Grewal, parents may tend to hide their child with ASD because of public shame.[2] Juthani (2001) describes how the family members approach the allopathic professional – doctor. They rely on him/her as a positive figure once they gain confidence in him/her. Parents in India tend to make decisions on behalf of their child, even when they are adults, and they expect the allopathic professional to show respect for their culture and religion, including a belief in the supernatural causes of the disorder[3].

Complementary and alternative medicine

For the purposes of this study, the commonly used term "complementary and alternative medicine" (hereinafter CAM) is also covered by the single word "intervention" (as defined in Thackery, 2002) – it is a notion which is broader than "treatment" or "medicine" and includes healthcare, religious practices, psychotherapy, special education, etc.

CAM has been defined as "a group of diverse medical and healthcare systems, practices, and products that are not generally considered part of conventional medicine" (National Centre of CAM, NCCAM, 2008). "Complementary" is used in conjunction with and an alternative to "conventional intervention" (CI). Considering the great heterogene-

[1] In Baviskar's (2010) study, "family" comprises of the closest caregivers of a child with ASD. Having a child with even mild ASD has serious consequences for the family. The attitude of the family to the child has several psychological phases (Thorová, 2006). As for the services and interventions chosen, the family is initially susceptible to shortcut solutions and crisis behaviour. Following this, for various reasons, family life is strongly affected, more than in the case of other developmental disabilities (Twoy, 2006). Therefore, a sensitive approach to family members is of crucial importance. The family itself uses various coping strategies. For Asian families in general, the most important coping strategies observed were religious coping and relation-based coping.

[2] They may not be able to find a spouse for the child's siblings. Interaction with other family members, including the extended family, is often denied to the child. On the other hand, the extended Indian family can provide the parents with extensive support, for example by showing understanding for the situation, acceptance and tolerance (Mamtani, 2002).

[3] When looking specifically at Kerala, a state in South India, a great intercultural variety can be observed (Raj, 2008). On the other hand, Kerala's society can be described as conservative (in comparison to the rest of modern India), preserving many ancient Indian traditions, especially in the world of religion, family and lifestyle (Raj, 2008). Kerala stands out as the world's Ayurvedic centre and home to various local approaches to mental health – from holistic traditional medicine to tribal medicine and spiritual healing.
The concept of the "Kerala model" has been described in the literature (McKibben, undated) – the state of Kerala has become well-known for its huge investment in human resources. This means that most Kerala citizens have access to allopathic psychiatric care, education, and in cities special education. The rising middle class has gained access to private medical care, including psychological support and hi-tech facilities.

ity of CAM, and all the more so in the context of a different culture, we shall first look at the definitions surrounding the conventional approach to ASD.[4]

Social work and Social Pedagogy

According to the IFSW General Meeting and the IASSW General Assembly, it is defined as follows: "Social work is a practice-based profession […] that promotes social change and development, social cohesion, and the empowerment and liberation of people. Principles of social justice, human rights, collective responsibility and respect for diversities are central to social work. Underpinned by theories of social work, social sciences, humanities and indigenous knowledge, social work engages people and structures to address life challenges and enhance wellbeing." (International, 2007, Musil, 2013). Social work as a profession originating in industrialised countries aims at understanding spiritual, cultural and ethnic specificities and respecting diversity in the areas within its mission (cf. International, 2007). In the Czech area eligible for the social work are people after studying mostly the area of social work, social pedagogy or special pedagogy (more Act No. 108/2006 Call.). There is a similar situation and similar conditions for the both professions also in other parts of the world.

Methodology

The research design required an inductive and qualitative research design. Semi-structured interviews were used to collect data, which provided a deeper insight into attitudes in a limited number of cases. In the research, the authors established the sample population as a number of social workers and one psychologist who intervene

[4] A phenomenon worth mentioning is the prominent position of the ancient Indian medical system of Ayurveda (Kurtz, 2008), homeopathy as a German alternative medical system widely used in India, followed by alternative approaches such as music therapy, meditation and yoga. These are the most widely used complementary interventions in India. Families in the West increasingly resort to CAM, evidence of which is brought out by research in multicultural Western countries (e.g. in Klitzke, 2010). The factors subject to study include mainly doubts about conventional interventions, in particular fear of side effects accompanying psychiatric medication (Hanson, 2009), frustration stemming from slow progress and hope for complete curing for those suffering from ASD, and also belief in the causes. In research into CAM this belief has been found to be related to culture; those resorting to CAM use these methods because they are "congruent with their values, beliefs and philosophical orientations" (Astin, 1998). In India, the position of CAM is hugely influenced by India state incentives for the use of indigenous medicine under The Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (or CAM in our sense) the equilateral triangle (Hausman, 2002) present in the Indian healthcare system – Ayurveda, homeopathy and allopathy. This approach is applied by physicians and affiliated professionals, and can be described as Western and evidence-based. Thorová (2006) defines it as the "mainstream" in the allopathic approach. Some of the practices of the conventional approach are, especially in the West, controlled by various governmental regulatory authorities.

in families with a child with ASD (other than community social workers) who were not present in training and non-allopathic clinical settings (such as Ayurvedic).[5] The respondents were collected using the "snowball method" (Gilbert, 2001). The respondents in the research were six social workers, psychiatric professionals of similar age, with a balanced gender distribution, each with a university degree.[6]

Reality of field research

While the social workers involved were familiar with and approved of the basic western concepts of perception of autism (the triad, comorbid conditions and organic background), in the research they added a description of children with ASD, defining them as *socially closed* (see Thorová, 2006). The thus-outlined form of the disorder is just one type of autism, with an emphasis on the impairment of social relationships (Daley, 2004). Surprisingly, along with the organic cause, the respondents also mentioned psychogenic causes – faulty parenting and under-stimulation. They described the changing lifestyle of modern Kerala, with its growing economy, increasing emigration (the "Gulf syndrome[7]"), etc., which were denoted as *globalisation in uence* in the research[8].

Basic job roles were described as education, skill training and psychoeducation. Training was characterised as *homebased training*, in which parents are trained to train children at their homes, and it seems to consist of the standard skill training and teaching procedures (e.g. applied behavioural analysis (ABA), structured learning, etc.). Training was seen as an essential element, and medication only rarely used and not regarded as very important for ASD treatment.

[5] For transcripts, some of the time-saving techniques described by Hendl (2005) were used, including the "summary the protocol" of the semi-structured interview pattern. This "segmentation process" (Hendl, 2005) was detailed by Nvivo 7 software. The topics which arose from the respondents' answers were subsequently coded and subjected to more general conclusions, identifying the specified codes across the respondents' answers.

[6] Standardised tests were inconceivable due to the demanding foreign cultural context and specificity of the topic (ASD and social work) (see Hirschkorn, 2005).The limitations of the qualitative research included the external validity question, as the Kerala culture and healthcare system are unique and different from the cultural perception of a researcher from the Czech Republic. One of the authors opened the research by conducting interviews directly in Kerala, with the respondents using "Malayalam English".

[7] The Gulf syndrome is labour migration to the Persian Gulf States which allows families in Kerala and other parts of India to live in a relative wealth including, for example, the construction of new housing. Children grow up in families consisting mainly of mothers and grandmothers.

[8] The respondents did not have a clear idea of what CAM (or alternative treatments or other concepts used in the allopathic research) meant, and often were hearing about it for the first time. Many of them would not use this term for indigenous Indian interventions. After a discussion with the respondents about what CAM can mean, we usually concluded that it was an *intervention di erent from our own*, one which was not "allopathic". Only one respondent claimed that "his" intervention is also with Ayurveda and homeopathy as the equilateral triangle system of medicine in India (Hausman, 2002).

Nevertheless, the respondents referred parents to a psychiatrist from time to time, which meant an additional financial burden for the patients in India. Families were also referred to other services, thereby making the intervention for children with ASD a complex act (cf. Daley, 2004). Social workers also provided psychosocial help for parents, mostly counselling and support groups. The respondents mostly claimed that religion did not play a major role in their professional work.

Social workers endeavoured to look at the families in their natural environment, behaviour and context. Frustration and non-acceptance of diagnoses were described as factors influencing the families' decision on treatment, patients' depression was also mentioned.

Family and CAM was regarded as communicating vessels. A family with a child with ASD receives frequent recommendations for CAM from other people (family members and friends) or some allopathic doctors, together with hope for a quick solution and failure to pay attention to the recommendations of medical practitioners in a wide range of possibilities for patients in what is called *doctor shopping*. The respondents further reflect *cultural reasons*, and the latter can be further divided into *positive* (health concept, strong religious belief, and the tradition of the first visit[9] to CAM) and *negative* (stigma, feelings of sin, and ignorance). Other cultural reasons for refusing allopathic medicine in Kerala that were frequently mentioned were *fear of side-effects* and *the effect of traditional views*[10] (as described by Juthani, 2006). One of the respondents also mentioned the insensitivity of the poor to behavioural abnormalities (Daley, 2004).

As for cultural differences, unsurprisingly, only one respondent expressed the opinion that CAM was related to religion in one way or another. The respondents agreed that conventional/allopathic medicine was *global* while CAM was local and that clinical experience is as important as scientific evidence[11].

The attitudes of the respondents suggested interest in new knowledge of CAM. The respondents admitted to not having a deep knowledge of the matter. Their evaluations were coded as *differentiated* – when faced with various CAM modalities, they shaped their opinion on the basis of evidence available and risk-benefit evaluation of each particular CAM type. Yoga, meditation and music therapy were appreciated by all the respondents (although one of them maintained that meditation was not practicable

[9] In India, allopathic doctors, and social workers in the same way, often receive patients/clients who know nothing about allopathic medicine at all. They consider themselves bound to educate patients/clients in topics that would be generally understood in Europe; for example, the meaning of mental illness and psychiatry.

[10] A patient looks for purely Ayurvedic answers or spiritual explanations (for example, bad Karma, etc.), and these beliefs influence the parents of a child with autism (stigmatic discouragement from visiting a doctor, etc.). Paradoxically, the Indian mother tends to be the first to understand that an allopathic intervention is appropriate and must win the family over for the visit to an allopathic doctor.

[11] However, the respondents did not see themselves as fully allopathic workers and drew a line between themselves and psychiatrists. As social workers, they provide training while doctors focus on allopathic medication. The reason behind this strategy seems to be the "stigma attached to psychiatry, all the stronger in non-metropolitan areas like the research site, i.e. the northern region of the state of Kerala".

for ASD). On the other hand, they did not agree on the usefulness of Ayurveda and homeopathy. The respondents saw training as a necessity, referring to the fact that alternative and complementary systems provided only herbal medication, and their providers sometimes discourage patients from visits to allopathic social workers, and that holistic medication was not strong enough.

The respondents found spiritual help and spiritual healing to be controversial issues in relation to families with a child with ASD. Four respondents believed that spiritual help and healing could help parents cope, and two claimed that they were able to help children with ASD themselves. Spirituality is perceived as interfered with the intervention of social work. The respondents claimed to be secularised and non-partial as required by the codes of social work ethics. Criticism in relation to spiritual help and spiritual healing was expressed while nonetheless showing the strong personal religious identity and faith which had so often been described as existing in Indian culture, and all the more so in Kerala. The idea of a spiritual cause of ASD was also strongly opposed.

As for their own personal health problems, CAM or conventional medicine was evaluated and chosen from a broad range of unorganised providers, without perceiving any conflict between alternative and conventional treatment. The situation of social care and healthcare in India was perceived as a space where providers with balanced influences offer their services. This balance of influences is mirrored in the Indian public healthcare policy and the system of higher medical education. This arrangement can be described by the fitting term *health bazaar*[12], i.e. a place where families tend to practice *doctor shopping* (Daley, 2004). At the bazaar, social workers also offer their services, strongly believing in scientific evidence and quality and the necessity of their services, although free of any uncompromising medicinally orthodox attitudes as in the case of some psychiatrists. This "practice" was a behavioural attitude pattern discernible in the answers of all the respondents, except for one who sincerely described it as his own evaluative pattern. In that pattern, the respondents attribute zero or poor knowledge to the parents, present their own personal *opinion* to them or reveal the negatives and positives of a CAM variant, then stress *what is necessary* (such as training provided in accordance with the clients' beliefs). Then they allow the parents *to have freedom of choice*. If the parents choose a CAM modality, social workers *permit* that modality and afterwards *make it complementary* to existing treatment by offering them training in applied behaviour analysis (ABA) and structured learning to use these in parallel with CAM[13].

[12] Term by Tomas Hudec, following to Daley (2004) term "doctor shopping". In India seems to be a looking for medical care more like shopping at a bazaar than in a supermarket with clear rules)

[13] In cases where the parents did not follow social workers' recommendations and omitted training, then the respondents, if they did not directly rule out the possibility of freedom of choice on the parents' side, talked about psychoeducation, in one case *diplomatic psychoeducation*, an effort to be made sensitively by social workers, having regard for cultural values and the system of belief. Three other respondents showed *respect for the belief system: "and another thing is that if you're a strong believer and you believe, the child will bene t;*

Despite this process, the respondents admit that they do not discuss this issue with parents very often and that they basically do not actively recommend or promote CAM unless the topic is raised.

Although many respondents feel a need for collaboration with other professionals in the form of discussions about clients and for designing integrative interventions, this collaboration is rather absent.

In the study, there was also found that the respondents in Kerala do not have any specific knowledge about CAM; they merely contemplated interventions which we labelled as structured learning or ABA). According to the respondents, scientific evidence should form the foundation of a professional worker's intervention. Psychoeducation is seen by them as the *conveying of facts and strategies for treatment of children with ASD*. The respondents in the research also agree that some of the attitudes they cannot work with are related to *cultural value*s and *religion*.

Social workers in Kerala regard some other interventions (such as those provided by spiritual healers) as available in the "open space" of the Indian *health bazaar* (for more on this, see also Daley, 2004). In the evaluation of CAM by social workers, from among what is offered on this market they choose effective solutions for the treatment of their own diseases, and they also rely on literature, their colleagues and personal experience. The respondents in the research perceive families using CAM as a subject to the *cultural value*s they have adopted, which also determine their help-seeking strategies, and regard them as somewhat lost in despair over their situation and unawareness of the possibilities available on the *health bazaar*.

In this context, the respondents offer their services without coercion or exhausting disputes with clients. When families broach the topic of alternative medicine, social workers apply a specific approach to dealing with such families in order to avoid losing their clients. They respect choice, culture and feelings of the parents with children with ASD and attempt to bring in their own point of view, reach a compromise and make CAM a *complementary* matter. On the other hand, the respondents – social workers in Kerala, use psychoeducation to attract clients to their concept of ASD, its treatment, prognosis and possible gains.

I can't stand against their belief system. I will tell them – you should continue training, in any case you should not stop this if you want to go to a religious practitioner (especially spiritual healers and help)". Empirical research has shown that spiritual support in general and spiritual healing in particular are an important category for social workers' clients. This can be explained by the nature of the local culture and local religions. Sensory integration therapy is another intervention used in Kerala, and finally, vitamin supplements and special diets can be mentioned as examples of alternative "biological treatment", surprisingly in use by several Kerala allopathic facilities.

Conclusion

The authors discussed the attitudes of professional social workers to complementary and alternative medicine for children with autism spectrum disorders. However, since a great number of people living in Kerala are rooted in traditional structures, especially the traditional Indian medicine of Ayurveda and the Hindu, Jain and Muslim or Christian religions, the social workers express their respect the clients' beliefs regarding the religious causes and treatment of autism; the social workers usually offer allopathic treatment as an extension of the options available. When looking at whether social workers act ethnocentrically, it should be noted that they act very sensitively and do not endeavour to convince their clients – families with children with ASD – to change their religious views. The social workers' perception of complementary and alternative medicine depends on their own view of the possibilities of such medicine and its offer and was within tolerance limits in the research sample. There was an effort to avoid losing parents as clients (and to avoid a culture clash), to behave in a specific way, which is described as "practice". The results of the study could be helpful in further psychosocial work and understanding of clients from a different cultural context, in the deepening of clearance of meanings in mutual communication.

References

Astin, J. A. Why patients use alternative medicine: Results of a national study. *Journal of the American Medical Association*, Vol. 279(19): p. 1548–1553, 1998.

Baviskar, B.S. *Understanding Indian Society: Past and Present.* New Delhi: Orient Blackswan, 2010.

Beck, U., Beck-Gernsheim. *Individualization and „precarious freedoms" : perspectives and controversies of a subject-oriented sociology*. In Heelas, P., Lash, C., Morris, P. (eds.) *Detraditionalization : Critical Re ections on Authority and Identity.* Oxford : Blackwell, p. 23–48, 1996..

Daley, T. (2004). From symptom recognition to diagnosis: children with autism in urban India, *Social Science & Medicine*, Vol. 58: p. 1323–1335, 2004.

Eyal, G. *The Autism Matrix: The Social Origins of the Autism Epidemic*, Cambridge: Polity Press, 2010.

Ferguson, H. In Defence (and Celebration) of Individualization and Life Politics for Social Work. *British Journal of Social Work*, roč. 33, č. 5, s. 699–707, 2003.

Geertz, C. *Interpretace kultur.* Praha: Slon, 2000.

Gilbert, N. *Researching Social Life.* Sage Publications: London, Thousand Oaks, New Delhi, 2001.

Grewal, S. *Diagnosis and Treatment Barriers Faced by South Asian Families in Canada Who Have Children Diagnosed with an Autism Spectrum Disorder.* Thesis. School of Professional Psychology. Forest Grove: Pacific university, 2010.

Grinker, R. R. *Unstranged Minds: Remapping the World of Autism*. Philadelphia: Basic Books, 2007.

Happé, F. *Autism. An introduction to psychosocial theory*. Harvard University Press: Cambridge, Massachussetts, 1995.

Harrington, J.W. Parental beliefs about autism: Implications for the treating physician. *SAGE Publications and The National Autistic Society*, Vol. 10(5): p. 452–462, 2006.

Hausman, G. J. Making medicine indigenous: Homeopathy in South India. *The society for the social history of medicine*, Vol. 15(2): p. 303–322, 2002.
Henderson, C. E. *Culture and customs of India*, Greenwood Press: Westport, London, 2002.
Hendl, J. *Kvalitativní výzkum. Základní metody a aplikace.* Praha: Portál, 2005.
Hirschkorn, K. A. Conceptualizing mainstream health care providers' behaviours in relation to complementary and alternative medicine. *Social Science & Medicine*, Vol. 61(1): p. 157–170, 2005.
Hudec, T. *The Attitudes of Social Workers in Kerala to Complementary and Alternative Interventions for Children with Autism Spectrum Disorders*, Diplomathesis, Masaryk university, 2012.
International de nition of the social work profession ; Ethics in social work, statement of principles; Global standards for the education and training of the social work profession. Place of publication not identified: International Federation of Social Workers (IFSW)/International Association of Schools of Social Work (IASSW), 2007.
Jonas, W. B. Advising Patients on the Use of complementary and alternative Medicine. *Applied Psychophysiology and Biofeedback*, Vol. 26 (3), p. 205–214, 2001.
Juthani, N.V. Psychiatric management of Hindus, *International Review of Psychiatry*, Vol. 13 (2): p. 125–130, 2001.
Klitzke, M.G. CAM in child mental health: Partnering with parents. *Child and Adolescent behaviour letter*, Vol. 26(8): p. 1, 2010.
Kurtz, L.A. Understanding Controversial Therapies for Children with Autism, Attention Deficit Disorder, and Other Learning Disabilities: A Guide to complementary and alternative therapie. Philadelphia: Jessica Kingsley Publishers Law No. 108/2006 Sb. on social services.
Mamtani, R. A primer of complementary and alternative medicine and its relevance in the treatment of mental health problems. *Psychiatric Quarterly*, Vol. 73(4): p. 367–384, 2002.
McKibben, B. What is true development? Kerala model. www.ashanet.org/library/articles/kerala.199803.html, not dated.
Murphy, R. F. Cultural and social antropology. An ouverture. Prentice-Hall, New Jersey, 1986.
Musil, L. *Challenges of Postmodern Institutionalisation for Education in Social Work.* In Matulayová, T., Musil, L. *Social Work, Education and Postmodernity. Theory and Studies in Selected Czech, Slovak and Polish Issues.* Liberec: Technical University of Liberec, 2013. p. 10–72, NCCAM. Publication No. D347. www.nccam.nih.gov/health/whatiscam, 2008.
Raj, S. V. *Blog for developing open-source compendium of Kerala society: structure and change.* Thiruvananthapuram: Loyola college of social sciences, 2008.
Sharma, R. K. Indian Society, Institutions And Change. Ocala: Atlantic, 2007.
Ševčíková, S., Navrátil, P. Sociální práce jako institucionalizace rizika v pozdně moderní době. *Sociální studia*, Brno: Fakulta sociálních studií MU, No. 2, p. 115–133, 2010.
Thorová, K. Poruchy autistickeho spektra. Praha: Portál, 2006.
Twoy, R. Coping strategies used by parents children with autism. *Journal of the American Academy of Nurse Practitioners*, Vol. 19 (5): p. 251–260, 2006.

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Reviews

Research Design (Qualitative, Quantitative and Mixed Methods Approaches)

Jan Gregar

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: SAGE Publications.

In 2014, the fourth edition of the book *Research Design: Qualitative, quantitative, and mixed methods approaches* was published (the first edition came out already in 1994). It was written by John W. Creswell, professor of educational psychology, who has been working at University of Nebraska–Lincoln for more than 30 years.

Creswell is the author of a number of works from the field of research (in humanities and social sciences), more concretely the field of research design while he focuses on the qualitative and mixed research design. The reviewed book is his first major work; he co-authored the previous books, e.g. *The Academic Chairperson's Handbook* (whose first edition came out in 1990 in University of Nebraska Press) in which Creswell describes the activities of academic chairpersons in various aspects – from administration and teaching to the area of human resources, i.e. hiring new workers or dealing with personnel conflicts. Another publication, which should be mentioned, is the book called *30 Essential Skills for the Qualitative Researcher* which was published in 2016, also in SAGE Publications. This book is very similar to the reviewed publication; however, it includes a more complex insight into the problematics of qualitative research (compared to a more general perspective of the reviewed book).

In the Czech environment, it is possible to find similar topics (definition of the research, its types, but also its construction, design, formulation of hypotheses and their verification, etc.), e.g. in publication *Úvod do pedagogického výzkumu* by P. Gavora (which was published in 2010 by Paido), or *Metody pedagogického výzkumu* (from 2007, published by Grada) by M. Chráska. However, the book by Gavora is more similar to the Cresswell's book since they are both dealing with the research at the general level – i.e. not only in the conditions of education and they are dealing with both qualitative and quantitative methods of research. On the other hand, Chráska deals more with the qualitative research and its statistical processing. In the environment of literature written in English, there are more works dealing with the research and its design; we should mention at least *Tricks of the Trade: How to Think about Your Research While You're Doing It* by H. Becker (published in 1998, by University of Chicago Press). This book provides even richer reserve of "tricks" which are based on various fields of humanities – history, literature, and even philosophy.

Research Design is a paperback with roughly 250 pages. It is divided into two similarly-sized parts: the first of them (the first 100 pages) is dealing with the general basis of the research – its types and areas of application, the role of literature in the research, and the use of theory. The last chapter, however, includes also practical advice how to write a scientific publication or how should be the ethical side of research. On the other hand, the second part of the publication (the remaining 150 pages) deals with the research in detail – not only its beginning (e.g. creation of an abstract, but also construction of aims and hypotheses), but also its course (while Cresswell describes both qualitative and quantitative approaches, he even gives practical examples of these approaches).

The book is clearly arranged; the interesting fact is that there are 3 types of contents: the first one is brief contents (which make the orientation in the book easier), the second one is detailed (in which it is possible to find page numbers of specific chapters and examples), and the last one – the analytic contents – which briefly describes also the topic of the chapter and its focus points which make the searching of information easier for people who are not entirely sure what they are searching for while they also lack necessary knowledge of the theory. All of the chapters are supplemented with tables and overviews which further facilitate the understanding the treatise. Each chapter is structured in the same way:

- Introduction – contains the basic outline of the topic of the chapter and its structure,
- Theoretical basis of the topic – defines the terms which are related to the topic of the chapter. They are also demonstrated on examples (see next item),
- Practical demonstration (examples),
- Summary – in the second half of a chapter. It contains the information which was presented to the reader in the chapter: the information that should be remembered for one's own research, what should be noted and what should be avoided,

- *"Writing exercises"* – i.e. exercises for research beginners which is a good means to make the book more varied and providing an overlap to the common educational practice while it refines its "textbook" nature,
- References to additional literature related to the topic of a chapter. Also a brief characteristics of the literature is presented which broadens the cognitive basis of research beginners even more.

An the end of the book, it is possible to note the glossary which provides a brief explanation of key words of the book which makes the orientation and understanding easier even for people with a limited knowledge of English educational terminology (the reviewer is Czech). The very end of the book is devoted to bibliography references and indexes (author index and subject index).

Cresswell intended the publication explicitly to students and educators in need of help with the research design, e.g. for their dissertation or article. It is excellent for beginners in the field of research (e.g. students of the post-gradual study) since it is written in a relatively simple English and it is understandable – the terms are clearly explained. Although it is written in English, even an individual with a slightly advanced knowledge of the language should have no problem understanding (since the glossary is also present at the end of the book, see above). Another plus is that the book is clearly structured into parts, chapters and sub-chapters – the presence of introduction and summarizing conclusion in every chapter is a great element of the book, even though it is not a typical element of professional literature.

However, this might be seen as a negative point of the book by some people – it is written mainly for "newbies" in the research and it manifests in e.g. its lapse into repetitiveness. Another negative point of the whole compact publication is the lack of detailed description of the execution of research itself – a student of doctoral study which is not educated in fields of statistics and coding is referred to additional literature (e.g. Chráska, 2007).

Nevertheless, I would recommend this book also to people who have a bit of experience in terms of research since it provides an overall insight into the issue of research and it motivates the reader to improve their research activities.

References

Becker, H. S. (1998). *Tricks of the trade: How to think about your research while you're doing it.* Chicago, IL: University of Chicago Press.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: SAGE Publications.

Creswell, J. W. (2016). *30 essential skills for the qualitative researcher*. Thousand Oaks, CA: SAGE Publications.

Gavora, P., Jůva, V., & Hlavatá, V. (2010). *Úvod do pedagogického výzkumu*. Brno: Paido.
Chráska, M. (2007). *Metody pedagogického výzkumu: Základy kvantitativního výzkumu*. Praha: Grada.

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