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Cramming Facts and Thinking Concepts: Instance of Preparation of Student Geography Teachers in Liberec

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Abstract

In general, geographical education is closed into two strands. First, in geographical content (knowledge), there are geographical facts on the one hand and on the other hand there is geographical thinking. Second, in geographical cognition there is rote learning in behavioral strategy on the one hand and on the other hand meaningful learning in constructivist strategy. This study presents interactions into the two strands and it describes theoretical sources that comes from geography, geographical education and cognitive psychology and presents experience of the Liberec students, student geography teachers, and their preparation for their job. Access is laying on key courses, Classroom Management, Czech Geographical Curriculum and Geographical Exercises and Projects. In geographical projects, fieldworks and enquiry are preferred. Geographical (scientific) content is emphasized that is transferred into school geographical education. Methods which are used in the text result from description of development of geographical education in the Czech R. (one hundred years). This evaluation is based on wider frame of geographical curriculum, above all on English curriculum and US geography standards. The key tool of analysis is used in a revision of Bloom's taxonomy of educational objectives. Results are implemented into the courses in which future geography teachers in Liberec are prepared and practiced.

Keywords: Geographical education, geographical teaching and learning, educational strategies, geographical content, taxonomy of educational objectives, geographical curriculum

Introduction

Comparison and deterministic approach in the Czech geographical education

In the Czech Republic, geographical education has long tradition. And for a long time, the Czech geographical education has been facing critique it is too rooted into memorizing and encyclopaedism. Harapat (1907) refused the approach of then geographical education

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and he recommended to emphasize using comparisons of data/facts for younger students; e.g. comparison of population of Bohemia and other countries of that time, and using a deterministic approach for older students. He followed scientific thinking of German theorists of the 19th century, Alexander von Humboldt and Ritter. Spalová (1931, 1933) also warned of memorizing and encyclopaedism at Czech school geography and she emphasized scientificity at teaching; e.g. use aerial photos in geography lessons.

British "new geography" in the Czech geographical education of 1970s and 1980s

In early 1970s, there was the last deep reform of education in the Czech Republic. The geographical education was based on British basement, Chorley & Haggett (1967) and Haggett (1968). It was implemented into Czechoslovakian schools from "Russian version of late 1960s which came from Haggett's model" (Brabec, at al., 1982). As the Austrian author, Lichtenberger (1984), noticed the similar procedure in reference to sources were applied at East German geographical education. Czechoslovakian authors of the reform, Brabec, et al. (1982) and Paulov (1980), emphasized British "new geography" 1960s approach (in: Rawling, 2001; Morgan & Lambert, 2005) of geographical education which should weaken memorizing/rote learning and encyclopaedism and strengthen scientificity ("empirical" approach) in geography lessons in Czechoslovakia. They claimed the "model" was opposite to the Czechoslovakian traditional geographical education "capes and bays" of early 1960s. Morgan & Lambert (2005) painted the same picture of the Hagget's 1960s model (scientificity, pace) that it should be opposite to traditional British geographical teaching, simply "capes and bays". The period of 1960s and early 1970s was the hegemony of spatial science that was based "on the 'three C's' of certainty (of empirical observations), coherence (of patterns, forms and processes) and cumulating (of knowledge and discovery)". (Barnes, Gregory 1997; in: Morgan, Lambert 2005, p. 22)

Scientificity and spatial models in Czechoslovakian geographical education were preferred in 1970s reform. The approach was completely different from up to now deterministic access in geographical geography and Marxian social and economic approach in school social and economic geography. The new approach was based on mathematics, statistics and spatial models (Brabec, et al., 1982) in geosphere (Figure 1). The change in geographical teaching was so different that fresh graduates of academic geography had to be retraining to be able exercise the access in geography lessons. The school geography teachers were against excessive abstraction (spatial models) and using mathematics, mathematical expression. The approach was not part of the university preparation.

An answer of Czech teachers on raising demands at geographical education, their skills, came in short time. Czech geography teachers returned to simple determinism in physical geography and to descriptiveness in social and economic geography. Very often they used curiosity, frequently out of geographical topic which they taught. This shift, from scientificity to simple descriptiveness, was highlighted during social and political changes, the Velvet revolution in Czechoslovakia in 1989. The topics of the communist regime, e.g. Warsaw Pact, Comecon (in political communist newspeak Council of Economic Mutual Aid) were omitted. Czech geography teachers returned to memorizing,

rote-learning ("capes and bays") and encyclopaedism. Their geography lessons stood on physical geography and geography of travelling/tourism (consequence of opening borders to Western Countries and possibility to travel free to "capitalist" abroad). Human geography was still called social and economic geography (Vávra, 2007). The changes in geographical education took Czech geography teachers' energy, their time, and Czech government did not help them and not support them. The resistance of Czech teachers were understandable - shift to descriptiveness, rote-learning and encyclopaedism.

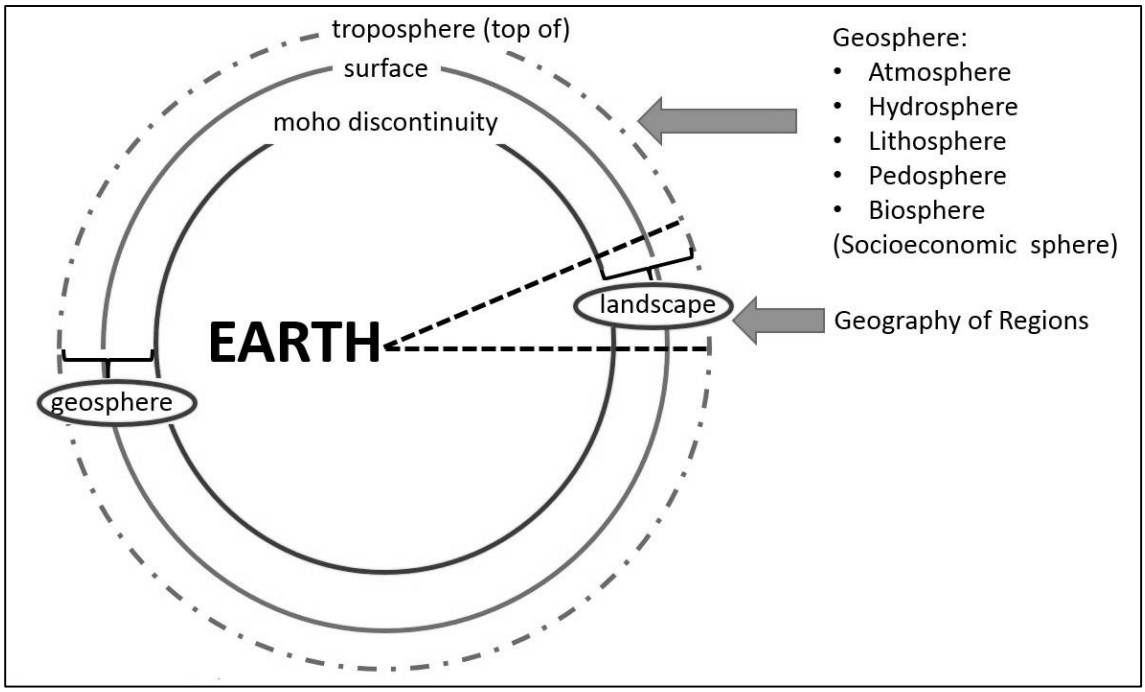

Figure 1.
Object of the Czech school geography in 1970s and 1980s.

From descriptive/memorizing geographical 'mantra' to geographical thinking?

The results of international survey PISA 2006 (in: Černocký, et al., 2011) shows, Czech students develop a great sum of findings and theories of science but they do not able to develop hypotheses, not to use various research methods, not to do experiments, not to gather and interpret data, not to critic their research results, not to formulate and prove their findings. Czech pupils learn about scientific phenomena and how to explain them but they do not learn how the phenomena to enquiry them. This state was already displayed in the similar results of TIMSS 1999. In general, recent survey of the Czech NGO People in Need (includes 60 Czech schools) shows only 2 per cent of students, age 15 and 20 consider schools as a primary resource of knowledge on societal issues. More than half of the students draws information from Czech mass media without a context. They often repeat the views of their parents.

Kolejka (2013) confirms the above mentioned state of Czech geographical education. He managed the team of Czech students (aged 15 and 19 years) on International Geographic Olympiad, iGeo 2013, in Japan. Young Czech representatives were good in communication in English language but they did not able to use enquiry and geographical thinking. Their results were sufficient in Written Response Test (WRT) and Fieldwork Test (FWT). Their results were excellent in Multimedia Test (MMT), which is classical knowledge test. The state was confirmed by results of iGeo 2014 in Cracow, Poland. The Czech representatives finished at 22nd of final table.

Department of geography, Technical university of Liberec (TUL), prepares student geography teachers who teach pupils aged 11 and 15. The history of the department started in 1998 and it is the youngest geography department of the nine in the Czech R. At the beginning, there was a basic question on geographical education in Liberec how to shift preparation of student geography education from rote-learning and encyclopaedism to higher level of geographical thinking, from behavioral strategy to cognitive/constructivist strategy, and on pedagogical geographical content/pedagogical content knowledge, PCK (Shulman, 1987). As Shulman emphasized *„[…] we learned how particular kind of content knowledge and pedagogical strategies necessarily interacted in the minds of teachers.“ (p. 5). On the next page, he claimed: „[…] teaching is trivialized, its complexities ignored, and its demands diminished.“ (p. 6).*

The outline of development of the Czech geographical education result in following questions:

1. How to shift mental pictures of future geography teachers in Liberec from factual thinking into knowledge-based thinking?
2. How to shift mental pictures of the students from 'topographical' thinking (space as topographical map) into 'topological' thinking (based on meanings)?
3. Is it possible to prepare future geography teachers and use both memorizing and thinking?

Liberec Model of student geography teachers' preparation

The critical approach in educational geography and practicing

Student geography teachers in Liberec have studied foreign literature on geographical education, e.g. International Charter on Geographical Education (Haubrich, 1994), Geography for Life (Bednarz, et al., 1994; Downs, et al., 2012), Thinking through Geography (Leat, 1998, 2001 and/or Geographiedidaktik (Rinschede, 2005).

In Liberec Department of geography, Matoušek (Matoušek, Trna, & Rychnovský, 1998) introduced US National Geography Standards, and Hynek (Hynek, 2000) International Charter on Geographical Education. In Conference of IGU, London, Vávra (Vávra, 2007) presented comparison of English original text of International Charter (Haubrich, 1994) and Czech translation/interpretation on the case of the concept 'place' and the structure of geographies (as science) in Czech R. He pointed out inaccuracies in

the Czech copy. Later, Artvinli & Kaya (2010) did similar analysis, however broader, of translation/interpretation of International Charter into Turkish language.

Vávra would implemented enquiry in Liberec geographical education and implemented Roberts' enquiry concept (Roberts, 2003, 2006, 2013). The emphasis was on students' active independent geographical education rested as much as on students' exercises and fieldworks, and developing their geographical experience. Teaching and learning in Liberec shifted from rote learning and factual knowledge to higher levels of a revision of Bloom's taxonomy (Anderson & Krathwohl, 2001) (in: Vávra, 2011).

In 2008, there was a turning point in preparing student geography teachers in Liberec. Implementation of the Bologna process into Liberec programmes meant transition from four-year master programme to structured three year bachelor and following two year master programme. Bachelor programme is conceived on geography and its four geography pillars are: physical geography, human geography, geography of regions (world and national) and geographic information (GI). Master programme is conceived on three key courses of geographical education: classroom management, geographical curriculum, and geographical exercises and projects. There are other geographical courses focused on geographical education (GI, world realms in school geography etc.).

In Liberec, the change of that time was supported by massive purchase of foreign literature for university and departmental libraries. Students were asked to study geography in foreign languages and they had to use at least passive knowledge of the languages, first of all English and/or German. This is important for student to use knowledge at their final works in which they present their acquaintance with issues of geographical education as well as geography.

Key Courses on geographical education in Liberec

Preparation of student geography teachers in Liberec comes from general Czech model that the Czech teachers are prepared in two school subjects, i.e. geography plus other school subject; e.g. English, or mathematics, or civics, or others. The structure of two school subjects is kept on bachelor level as well as following master level. Each department of the Technical University of Liberec (TUL) guarantees its science/subject. That means the Department of Geography guarantees geography and geographical education. Structure of the preparation of student geography teachers composes of three parts, the first one is geography, the second part is the other subject (English, mathematics, or others) and the third part is pedagogy (pedagogy, psychology, didactics, pedagogical practicum at clinical schools, and others).

Courses of the Department (geography) that are focused on geographical education. The Department guarantees following levels and courses (as examples):

- **Bachelor Level**: Introduction into geographical education, and two Geographical fieldworks for student geography teachers - two five-day blocks at rural areas near Liberec with physical and human geographical content
- **Master Level**: Classroom management, Geographical curriculum, Exercises and projects on geographical education, and Fieldwork/expedition – a five-day block at remote areas, e.g. neighbouring countries, Germany, Poland, Slovakia, and/or Austria.

The following text deals with three key courses at master level: Classroom management, Geographical curriculum, and Exercises and projects on geographical education.

Classroom Management

Theoretical Basis

In Liberec, geographical education starts with the course, Classroom management at first semester of the first year of master level, and at next semester Geographical curriculum follows. Somebody might say the sequence should be vice versa, but the sequence is given the students start their pedagogical practicum at clinical schools at the same time, and they should be ready to teach at a classroom of clinical schools and to manage geography lessons. The teaching practicum consists of 5 - 8 geography lessons and 2 - 5 peer-to-peer lessons per a semester (a student and his/her cooperating clinical school teacher). It means that students teach his/her lesson of each two weeks. It seems students have a lot of time to prepare for his/her teaching. But they visit lectures (courses) and exercises at TUL, and real time for his/her preparation for teaching at a faculty school is much shorter than should be.

Students, student geography teachers, study Gersmehl's concept of geographical education (Gersmehl, 2005, 2008). The concept helps them to loose from Czech traditional emphasizing of geographical location/sites and other conventional elements as are area/regions, number of population, list of mountains, of rivers, and so forth. Students are conducted into spatial and spatio-temporal thinking. To be free from memorizing, encyclopaedism and descriptiveness, the students learn to use hierarchy of educational objectives which is presented by a revision of Bloom's Taxonomy (Anderson & Krathwohl, 2001). Czech geographical education, similar to Germen geographical education (Rinschede, 2005; Kulke, 2007; Haversath, 2012) is built on competences. Czech key competences are four: knowledge, skills, attitudes and values (Fig. 2).

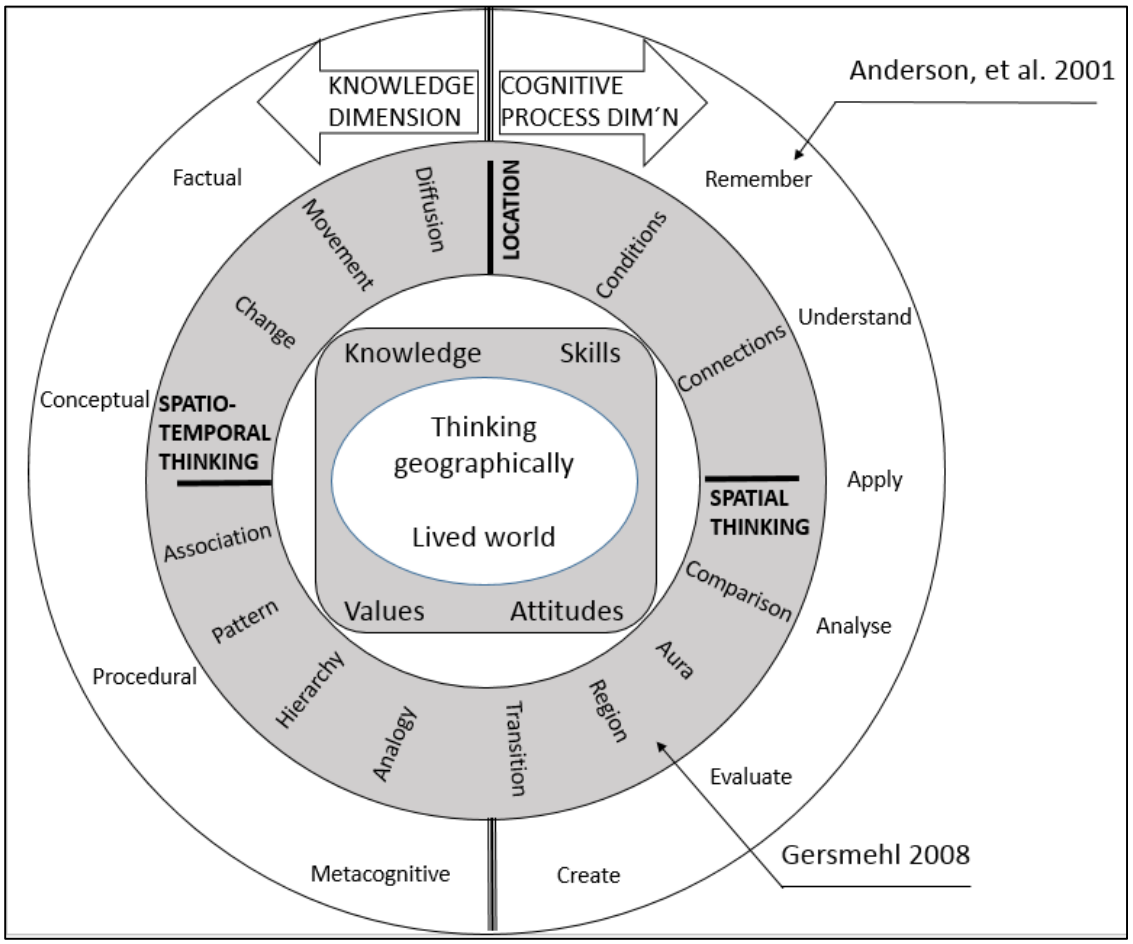

Figure 2.
Liberec Model of Geographical Education/geographical thinking (competences, concepts and hierarchy of educational objectives). Source: (Vávra, 2013)

Basic teaching and learning frame/model (Figure 3) that the students practise in geographical education comes from Leat, (1998, 2001) and is also presented by Lambert & Balderstone (Lambert Balderston, 2000, p.308; Lambert & Balderstone, 2010, p. 149). At the beginning, students develop terms, definitions which are "stored" into their individual dictionaries (“storages”). After the phase, the elements of the "storage" is practised so long as the students, student geography teachers as well as pupils, are prepared using them at e.g. talk, discussion. Storage and conceptualisation of the "storage” make the zone of proximal development (Vygotsky, 1978; Roberts, 2003; Slavin, 2012) which is important for individual/group knowledge and cognition. During "defending" of the individual/group knowledge/cognition happens clash of different even antagonistic, contradictory arguments, concepts, principles, theories which may be spread into individual/group critical judgement of existing a zone of proximal development of the individual (student) (Figure 3). Then, an individual (student geography teacher as well as a pupil) has two possibilities. Either stay on a blindly plead his/her up to a old zone, or

covers up new knowledge and conceptualized them in a new zone. This is called bridging, shift into a new zone that suits new pieces of knowledge which the individual can justify in his/her mind. It is necessary to say the process of education run in pupils' as well as teachers' minds.

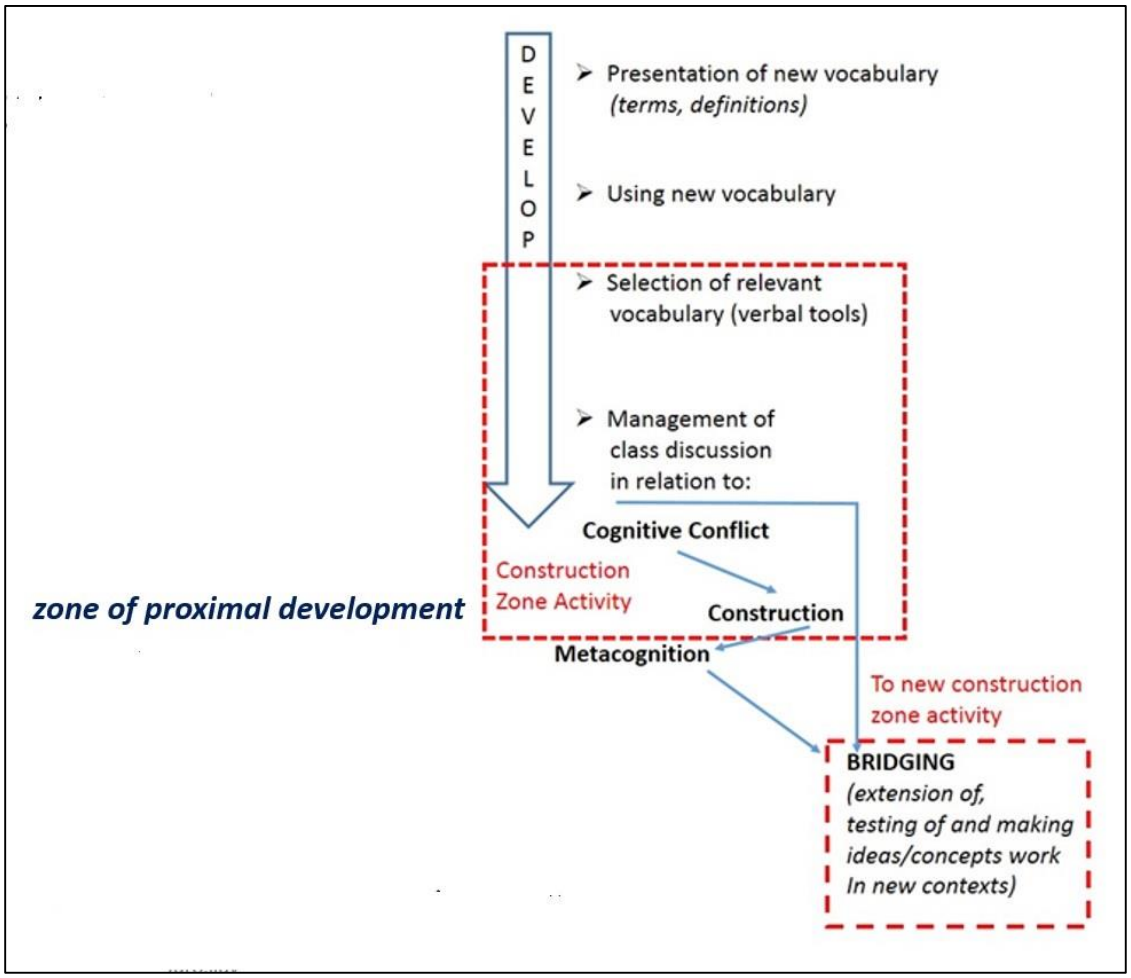

Figure 3.
Construction Zone Activity. Source: Leat 1998; in: Lambert& Balderstone 2000, p. 308 and Lambert& Balderstone 2010, p. 149, modified)

As for a teacher the more experienced, skilled the teacher is as for theories, concepts, principles, and the less inclination to bridging into the new zone as well as new concepts.[2] On the other hand at knowledge society, the outside modification of knowledge are fluid and faster, and this forces teachers (student geography teachers) for high demands and

[2] Compare **a zone of proximal development** and **a comfort zone**. The latter is "*a behavioral state within which a person operates in an anxiety-neutral condition, using a limited set of behaviors to deliver a steady level of performance, usually without a sense of risk.*" (White, 2008, p. 1). A person tends to stay within that zone without stepping outside of it. To step outside his/her comfort zone, a person must experiment with new and different behaviours, and then experience the new and different responses that occur within their environment. Not all persons are willing to leave the zone.

of course they make resistance against progression, because in as much they mishandling the new zone (‘comfort zone’) and the "old" zone does not suit. [3] The teachers stay in specific “conceptual vacuum” and solve the situation moving back to the stage of their individual "dictionaries" or "storages". This situation has been also the situation of Czech teachers (not necessary just geography teachers, but the most Czech teachers) after 1989 (Velvet revolution). The period was “societal evolution” as well as “knowledge revolution”. The Czech government has left teachers in such "conceptual vacuum" and at educational situation “do it yourself”.

According to Vygotsky's Construction Zone Activity Liberec student geography teachers go "linguistically". It is the same method as learning words in a foreign language. The students first of all have to make and use their vocabularies (“storages”), to understand generalisation (theories, principles, concepts) and use them at talks/discussion actively. The student geography teachers learn pupils at clinical schools who need in both facts, data, short question and short answer which are teaching and learning in behaviourist strategy, and processes in cognitive strategy and generalisations or projects in constructivist strategy (Figure 4). The last is important for discussion and critical thinking and refinement of students’ opinions and their perspectives in problem-solving (Lambert, 2009). A constructivist strategy is also used for geographical education in enquiry-style (Roberts, 2003, 2006, 2013).

[3] Rivkin, Hanushek, & Kain (2005, p. 435) demonstrate the 'resistance' of experienced teachers as "[…] *the learning curve appears to be quite steep in the first year or two of teaching before flattening out*."

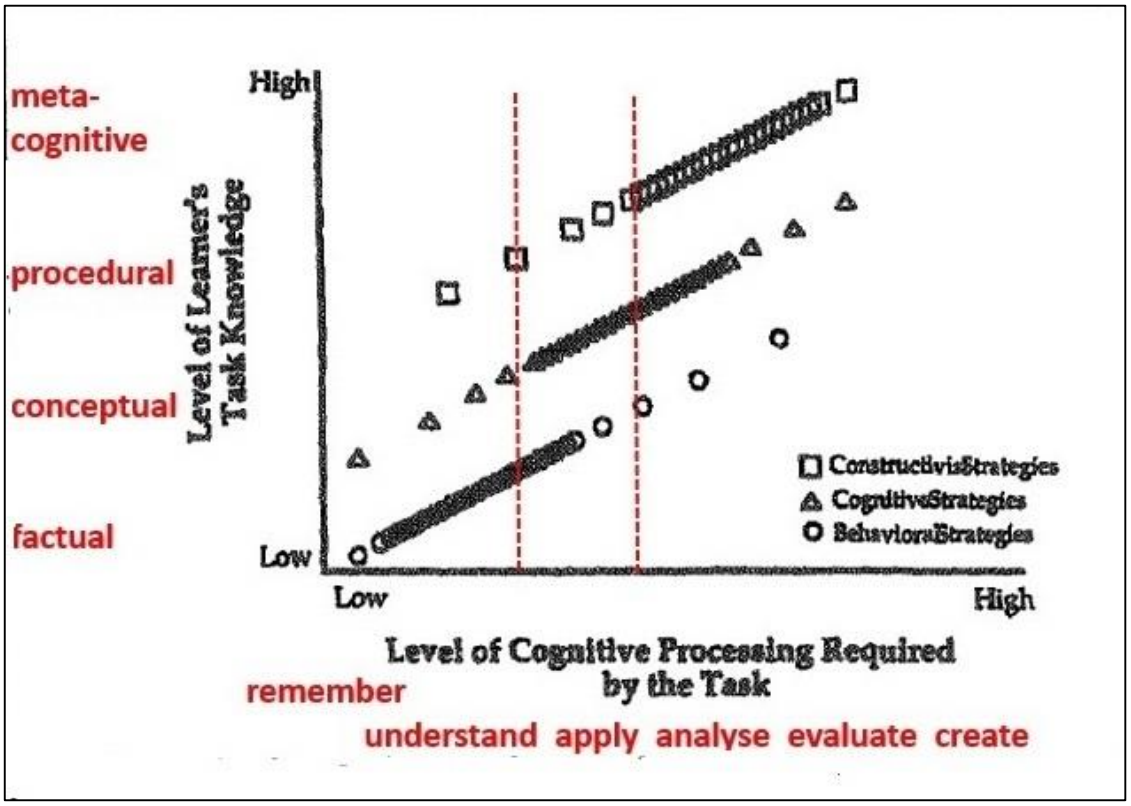

Figure 4.
Instructional Strategies and a Revision of Bloom´s Taxonomy
Source: Ertmer & Newby 1993, modified

As Ausubel (1968) claims, styles of teaching vary, in the first place, because teachers' personalities vary. In preparing of student geography teachers in Liberec we start from behavioural teaching strategies (from factual thinking) and a next step is support student geography teachers in cognitive and constructive teaching strategies (towards evaluation and creation and toward conceptual/procedural thinking and metacognition). The self-reflection of our students is at the end of their each teaching activity.

Why is used behavioural strategy so often (Table 1)? When we evaluate strengths and weaknesses of the three strategies it is apparent the behavioural strategy is strongest in effectiveness to be successful at knowledge test. Kolejka, (2013) warns this is a reason why Czech young representatives were successful at knowledge test in iGeo 2013 and they failed through tasks on geographical thinking. As for the cognitive strategy, it is evident, the strategy is the strongest in the way learning one process in which students reach quickly and safely the results. This is not open-ended process. The students do not justify about a choice. There is no choice for pupils, the result and the process is unified, firm and learned (at rote-learning?). It is similar to assembly-line work as is presented in Charles Chaplin' film, Modern Times (1936). The method is strongest in employing

pupils and discipline them in mechanical (rote) learning for a time and the teacher of the time in a classroom can "regenerate" his/her energy.

Table 1.
Strengths/Weaknesses of the Teaching Strategies
Source: Schuman, 1996, modified

T'g Strategy	Strengths	Weaknesses
Behavioural	A student can see a clear aim, his/her response conforms the aim. Prompt according with the aim brings prompt answer corresponding with the aim. This is way how to train didactic tests. This is a base for rote learning. His/her answers are quick and often correct. (e.g. capes and bays approach)	'Correct'answer requires 'correct' cue. If trained cues stop, a student stops his/her activity. A student needs situation/situations in which trained cues are present because of 'action and reaction' function. If no ,correct' cues, there are no ,correct' answers.
Cognitive	The aim is to teach and learn a student to doing st. in the same/uniform way. This teaching and learning influent influences/affects student's thinking and behaviour. His/her thinking and behaviour become consistent, e.g. movement and behaviour of clients in fast-food restaurants. Why are the restaurants fast?	A student is trained in one way how to do st. The way may not be the best way how to do st. For example, a student starts to use new edition of atlas and it raise big problem because of new way using it. The student cannot understand a conception and/or meaning of the organisation of maps in the atlas.
Constructivist	The strategy is important for teamwork and/or cooperation with other people. If a student is not able to see reality/imagines by the other's eyes, he/she will not be able understand, e.g. opinions of the others. (thinking laterally, alternatively)	There is a problem in situations, in which a student has to react in a specific/well-defined/trained way (e.g. as a soldier, pilot). Various views are counter-productive in (dangerous) situation where there is no time for choosing a correct way/reaction.

Our survey of classroom observations at clinical schools (geography lessons) says the students (student geography teachers) use the behavioural (less cognitive) strategies at

first lesson of their teaching. When they asked after the lesson they agree the learning geographical thinking for their pupils is important.

Are there any interactions between the teaching strategies and the zone of construction activity? It is necessary to remind again we are finding relationship between factual/procedural knowledge and conceptual/metacognitive knowledge at content of geographical education and between behavioural/cognitive strategy and constructivist strategy, and how the knowledge to reach in learning process. In other words, pupils, however as well teachers, because we speak about learning and teaching in general, need to find degree in reaching educational objectives with qualities, mentioned above. An individual in educational and geographical generalisation need big enough and suitable vocabulary which is not in malaprop-style, an archetype of a character would be in Sheridan's dramatic play, The Rivals (1775), Mrs. Malaprop. The degree is flexible between limits which are presented in Figures 2 and 3, and in Table 1.

Liberec Students' Practice at Seminars of Classroom Management

In the course Liberec student teachers prepare their first geography lessons. They act at sequent steps:

- They choose a generalisation and subsequently they add vocabulary and facts (Task, Bruner, 1960, 1977, see Figure 5)
- after critical thinking they revise and correct the first step (Revised Task, see Figure 5)
- they prepare unit of four geography lessons in which included the generalisation
- they prepare the first, middle and the last geography lessons

Student teachers in Liberec choose their own generalisations of physical or human geographies. Physical geography, e.g. plate tectonics according to Wegener's continental drift theory, or Humboldt, Ritter and Passarge's zonal ecosystems (in: Latz, 2012), and human geography, e.g. demographic transition theory (Thompson 1929; in: Lambert & Balderstone, 2010; in: Vávra, 2012). Students use other concepts - water cycle of the Earth, atmospheric circulation, distribution of population, industries, migration etc. For example, demographic transition is generalisation, natality/mortality/natural increase/decrease, population pyramid (vocabularies) are terms, and concrete data of each country and definition learned by heart are the lowest level of the Bruner model (Bruner, 1960, 1977). Examples of such geographical generalisations, models, schemas are in *Zeměpisný náčrtník* (Geographical Schemas; Sobotová & Sobota, 1996) in black and white pictures/images, or in *Geography. An Integrated Approach* (Waugh, 1995, 2009).

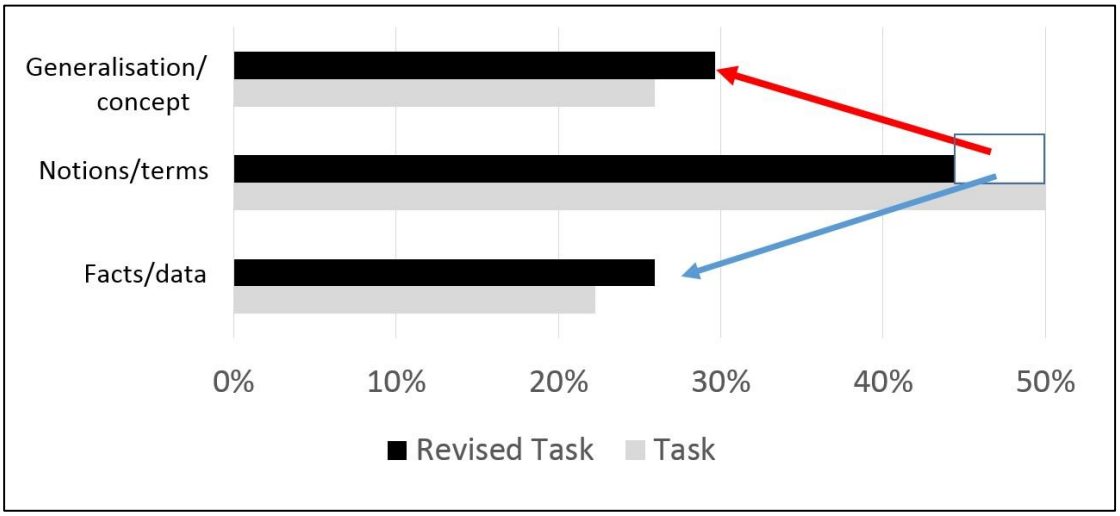

Figure 5.
Generalisation-notions-facts in Bruner model in Task and Revised Task, free choice of generalisation/concepts, Liberec student geography teachers at the beginning of the study programme (N = 27; December 2013)

In academic year 2013/2014, 27 student geography teachers choose their own generalisation/concept according to Bruner's Model in the first task and add appropriate notions (glossaries) and facts (data). Consequently after discussion they revised the task (Task II). Figure 5 shows that student had problem to set generalisation and after correction some of them shift their conception into factual knowledge.

The result of the survey (27 of geography student teachers of Liberec, Task) prefer glossaries/dictionaries (terms, notions). About a quarter of 27 student teachers prefer use only facts, data and other quarter use generalisations/concepts. The big problem of the students is to put together the three parts (Bruner, 1960, 1977).

After discussion and explanation of Bruner's model and its application in geographical teacher education, student geography teachers correct their Task, see Figure 5, and make Revised Task. The result of Task II is not much different from the result of Task. Some of the students resolved the task they moved back to level "facts/data" and they were not able to shift into higher levels (terms and generalisations). They were finding their arguments in Czech geography textbooks or other Czech scaffolding. Facts/data are useful for them to teach and use memorizing (rote learning) or use definitions to learn them by heart. It is evident that the Liberec students (student geography teachers) refer trans-missive learning (mechanical, encyclopaedic), and not critical thinking.

Geographical curriculum

Intention of the Czech (geographical) curriculum is on basis of conceptual thinking which is supported by factual thinking. (Jeřábek & Tupý 2009). The Liberec student geography

teachers use the national curriculum and create their own school curricula on geographical science and its transfer into classroom (Haskell, 2001), to organize geographical topics/themes (their sequent steps), to use principle of developmental geographical curriculum (Bruner, 1960, 1977; Ausubel, 1968; Vygotsky, 1978; Slavin, 2012), to differentiate learning into two/three groups of pupils in classroom and using hierarchy of geographical cognition and knowledge (Anderson & Krathwohl, 2001) and instructional strategies (Fig 4).

The tasks of Liberec student geography teachers of the course is to transfer national geography curriculum into his/her own school geography curriculum. There are following steps:

- they choose generalisation (see the Task at Classroom management), they choose Czech geographical textbooks, videos, popular books for children
- they organize chosen generalisation into a unit of four geography lessons (see Classroom management) with Czech geographical textbook and other scaffolding
- they create a year school geography curriculum for chosen grade (the choice is from 6th to 9th grade)
- they create four-year school geography curriculum (four grades for pupils aged 10 and 14)
- they discuss their own school geography curricula

In the course, student geography teachers practise evaluating outcomes of national geographical curriculum by a Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001). When they create their own geographical school curriculum, they evaluate geographical outcomes from national (intended/standardized) curriculum. It is important for the Liberec student geography teachers studying school geographical curricula that they are used in their clinical school where the students do their practicum. In general, understanding and application of cognitive dimension and factual and procedural dimension of knowledge (Anderson & Krathwohl, 2001) prevail in the Czech national geographical curriculum.

Results of the practice is that the Liberec student geography teachers realise more and more how to shift teaching and learning from understanding and teaching of facts to higher levels of Revision of Bloom's Taxonomy (Anderson & Krathwohl, 2001). Very often, the students speak about their cooperating certified clinical school teachers excuse their memorizing in classroom that the memorizing is useful for their pupils because the pupils do not know facts and it is important teach them "capes and bays" again and again. The certified teachers of clinical schools in Liberec do not mention that more intelligent pupils needs higher levels of geographical thinking. If they mention the intelligent pupils, they often say they teach them more facts, this is a quantitative way. The Liberec student geography teachers realise the situation but they are not sure how to prepare and realise the teaching and learning at classroom at higher levels of Bloom’s taxonomy. Some of

them realise an idea in his/her final master work. That part of the final work he/she has to verify at teaching and learning at classroom.

Geographical educational projects and practice

The third course of geographical education in Liberec Department of geography which combines academic preparation and practical activities in a field is Geographical projects and exercises at schools. This is a seminar work. Student geography teachers pick out geographical themes/topics which deal of Liberec city/region, suitable for geographical education at schools in general, e.g. housing estates of 1970s/1980s and residential housing of 1990s/2000s, urban and suburban areas, the city and the river Neisse, distribution of sports sites, pattern of railway station and safety in the area, Liberec in Lynch-style maps (Lynch, 1960/2004), Liberec in Gould-style maps (Gould & White, 1974) spatial development of Liberec before and after WWII, urban and suburban transport etc.

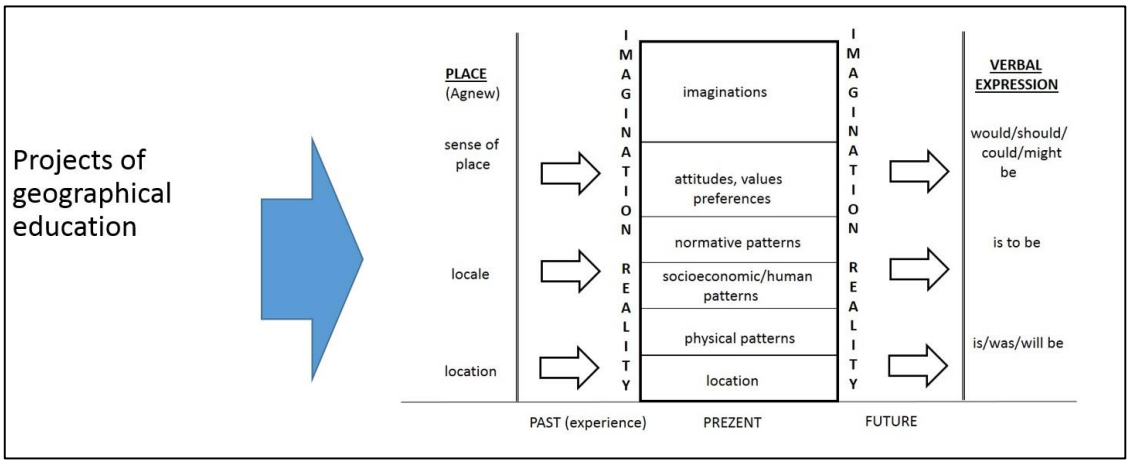

Figure 6
Concept of Project of geographical education in Liberec
Source: (Vávra, 2013)

Students work in teams (two/three members) and pick and choose area in Liberec, do recognition and survey in chosen are quantitatively and qualitatively, *in situ* (Figure 6). The aim is to do geographical, close to science, analysis of the issue of the area.

After that they do transfer geographical project/cognition and knowledge into project of geographical education. They suggest the title of the educational project, geographical and educational aims. They applicate knowledge and cognition of their second school subject (e.g. history, civics, mathematics and others). They have to construct of the project in relation to age of pupils, number of pupils in classroom, time disposition etc. Because the student geography teachers prepare their educational projects for outside/outdoor teaching and learning (in chosen area of Liberec, *in situ*), they have to make alternatives

as for weather. They often suggest to realise the project at the end of school year. Students have to be aware of material conditions, financial possibilities. In a seminar, the students present their final projects in front of their peers and educators.

The educational geographical projects are so attractive that some students decide to continue in the projects in final work (MA work), or they use a part of their projects in other seminar works. The student geography teachers appreciate they recognize the Liberec areas and learn about residents and about their imagination of their homes and neighbourhoods. The students understand the project as challenge for themselves. For example, some of the students survey Roma ghettos, places that are not the part of their everyday activities.

Summary and conclusion

Since 2004 when the presented model of preparing of the student geography teachers in Liberec was started in operation, it arouse hot talks among the students. The students were used teaching and learning based on factual knowledge (cramming facts), and conceptual approach and enquiry (geographical thinking) in school geography was quite new. The new approach of preparing student geography teachers in Liberec needs factual and procedural knowledge as well as conceptual and metacognitive knowledge. It is important for the Liberec students to manage their pupils to active and independent in their geographical thinking.

During the talks on the model or in the final works most of the students appreciate and prove their conceptual and metacognitive approach and geographical thinking in teaching and learning. The students shift the school geography from "cramming" school subject to respected school subject that requires preparation and thinking. Experience of observation in clinical schools shows the student geography teachers during three-cycled practicum move themselves from rote-learning/behavioural strategy into constructivist strategy. Nevertheless at the beginning of their career of a geography teacher half of the students are able to teaching and learning in constructivist strategy. The other half of them are at least award they prefer rote-learning too much.

In history of the last 10 years preparing geography teachers in Liberec there has been an effect of the approach. At present most of the geography teachers of clinical schools who transfer their experience and knowledge to the student geography teachers are the teachers who were being prepared for their profession at Liberec Department of Geography.

Kolejka‘s (2013) experience of iGeo 2013 was mentioned above. He suggests how to improve the quality of Czech geographical education. He claims geographical knowledge/skills of Czech primary and secondary geography teachers, e.g. regional descriptive, generic, terminological, has to be strengthen. His experience shows Czech pupils know facts, they know how to perform exactly assigned tasks in a fieldwork, to

use analytical tools on spatial data, and to realize a theoretic task with delivered data. But they are not able to present their results in fieldwork. Kolejka says the student miss geographical concepts, what to do with founded spatial data. The Czech students have no idea how to use their results, how the geographical ideas transform into spatial problem solving in the surveyed area. He suggests a solution of the Czech geographical education in geographical educational projects. He recommends very strongly to change teaching and learning in classroom. The starting point he sees in changing content and conception of Czech geographical textbooks.

As how it was presented in the text, the Liberec model of preparation of student geography teachers extends the Kolejka's idea. The model presents the balance between cramming facts at minimum amount and geographical thinking at maximum level.

References

Anderson, L. W., & Krathwohl, D. R. (2001). *A Taxonomy for Learning, Teaching and Assessing* (Abridged Edition ed.). Addison Wesley Longman, Inc.

Artvinli, E., & Kaya, N. (2010). *1992 International Charter on Geographical Education and Its Reflections in Turkey*. Získáno 15. June 2012, z http://www.igu-cge.org/charter-translations/22.%20Turkish.pdf

Ausubel, D. P. (1968). *Educational Psychology. A Cognitive View.* New York: Holt, Rinehart and Winston, Inc.

Bednarz, S. W., Bettis, N. C., Boehm, R. G., de Souza, A. R., Downs, R. M., Marran, J. F., . . . Slater, C. L. (1994). *Geography for Life. National Geography Standards 1994* (1st ed.). Washington D.C., USA: National Geographic Research & Exploration.

Brabec, F., Černoch, F., Demek, J., Feranec, J., Herber, J., Mičian, Ľ., . . . Wimmer, G. (1982). *O novom chápaní výchovy a vzdělávania na stredných školách. Zemepis pre stredné školy. študijné texty na prípravu pedagogických pracovníkov.* (M. Gúčiková, Editor) Bratislava: Slovenské pedagogické nakladateĺstvo.

Bruner, J. (1960, 1977). *The Process of Education. A Landmark in Educational Theory* (Twenty-seventh printing, 2003 ed.). Hardvard University Press.

Černocký, B., Hedvábná, H., Herink, J., Janoušková, S., Kubištová, I., Maršák, J., . . . Svobodová, J. (2011). *Přírodovědná gramotnost ve výuce. Příručka pro učitele se souborem úloh.* Praha: Národní ústav pro vzdělávání, školské poradenské zařízení a zařízení pro další vzdělávání pedagogických pracovníků, divize VÚP.

Downs, R. M., Whitham Bednarz, S., Bock, J. K., Fitzpatrick, C., Gray Jr., P. T., Gallagher Heffron, S., . . . Stoltman, J. P. (2012). *Geography for Life: National Geography Standards* (Second Edition. Geography Education National Implementation Project ed.). Washington: National Council for Geographic Education.

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, Cognitivism, Constructivism: Critical Features from an Instructional Design Perspective. *6(4)*, pp. 50-72.

Gersmehl, P. (2005). *Teaching Geography* (1th ed.). New York: The Guilford Press.

Gersmehl, P. (2008). *Teaching Geography* (2nd ed.). New York: The Guilford Press.

Gould, P., & White, R. (1974). *Mental Maps* (Second edition, 1986, Transferred to digital printing 2003 ed.). London: Routledge.

Haggett, P. (1968). *Prostranstvennyj analiz v ekonomičeskoj geografii.* Moskva: Progress.

Harapat, J. (1907). *Rozpravy zeměpisné. Hledě zvláště k cíli a účelu, k obsahu i rozsahu, k osnovám, methodám a pomůckám, jakož i k historickému vývoji vědy a učby zeměpisné.* (Sv. Díl I.). Praha: Nákladem "Dědictví Komenského", tiskem Ladislava Grunda.

Haskell, R. E. (2001). *Transfer of Learning. Cognition, Instruction, and Reasoning* (Educational Psychology Series ed.). San Diego: Academic Press.

Haubrich, H. (. (1994). *International Charter on Geographical Education (1992).* Freiburg: Commission on Geographical Education, IGU/UGI.

Haversath, J.-B. (2012). *Geographiedidaktik.* Braunschweig: Bildungshaus Schulbuchverlage, Westermann.

Hynek, A. (2000). *Vzdělávání zeměpisem.* Získáno 9. říjen 2006, z Školní vzdělávací programy: http://svp.muni.cz/ukazat.php?docId=226

Chorley, R. J., & Haggett, P. (1967). *Models in Geography.* London: Methuen.

Jeřábek, J., & Tupý, J. (. (2009, leden 26). Framework Education Programme for Elementary Education. FEP EE (with amendments as of 1st September 2007). Retrieved November 20, 2012, from rvp.cz: http://rvp.cz/informace/wp-content/uploads/2009/09/RVP_ZV_EN_final.pdf

Jeřábek, J., Krčková, S., & Slejšková, L. (. (2007). Framework Education Programme for Secondary General Education (Grammar Schools) (in the Czech R.). Retrieved January 12, 2013, from rvp.cz: http://rvp.cz/informace/wp-content/uploads/2009/09/RVP_G-anj.pdf

Kolejka, J. (2013). Náměty a inspirace z letošní světové zeměpisné olympiády. *Časopis pro výuku přírodovědných předmětů na základních a středních školách. Biologie, chemie,zeměpis, 22*(5).

Kulke, E. (. (2007). *Educational Standards in Geography for the Intermediate School Certificate*. (Deutsche Gesellschaft für Geographie) Retrieved December 22, 2008, from DGfG - Deutsche Gesellschaft für Geographie e.V.: http://www.geographie.de/docs/geography_education.pdf

Lambert, D. (2009). *A Different View. A manifesto from the Geographical Association.* Sheffield: The Geographical Association.

Lambert, D., & Balderstone, D. (2000). *Learning to Teach Geography in the Secondary School. A Companion to School Experience* (1st Edition ed.). Abingdon: RoutledgeFalmer.

Lambert, D., & Balderstone, D. (2010). *Learning to teach geography in the secondary school: a companion to school experience.* Abingdon: Routledge.

Latz, W. (2012). *Diercke Geography, advanced level.* Braunschweig: Westermann Schroedel Diersterweg Schöningh Winklers GmbH.

Leat, D. (1998, 2001). *Thinking Through Geography* (2 ed.). (D. Leat, Ed.) London: Chris Kington Publishing.

Lichtenberger, E. (1984). The German-speaking countries. In R. Johnston, & P. Claval, *Geography since the second world war* (pp. 156-184). Beckenham: Croom Helm Ltd.

Lynch, K. (1960/2004). *Obraz města. The Image of the City.* (L. Popelová, & J. Huťa, Překl.) Praha: Nakladatelství RNDr. Ivana Hexnerová - BOVA POLYGON.

Matoušek, A., Trna, J., & Rychnovský, B. (1998). Fyzickogeografické standardy ve vztahu ke standardům z přírodních věd. stránky 417-422.

Morgan, J., & Lambert, D. (2005). *Geography. Teaching School Subjects 11-19.* Abingdon: Routledge.

Paulov, J. (1980). *Zeměpis pro I. ročník gymnázií. II. část. Pokusná učebnice.* (H. Převrátilová, Editor, & S. Chod, Překl.) Praha: Státní pedagogické nakladatelství.

Rawling, E. M. (2001). *Changing the Subject. The impact of national policy on school geography 1980-2000.* Sheffield: the Geographical Association.

Rinschede, G. (2005). *Geographiedidaktik* (2., aktualisierte Auflage Ausg.). Paderborn: Verlag Ferdinand Schöningh GmbH.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005, March). Teachers, Schools, and Academic Achievement. *Econometrica, 73*(2), 417-458.

Roberts, M. (2003). *Learning through Enquiry. Making sense of geography in the key stage 3 classroom.* Sheffield: The Geographical Association.

Roberts, M. (2006). Geographical enquiry. In D. Balderstone (ed.), & R. Pipes (Ed.), *Secondary Geography Handbook* (pp. 90-105). Sheffield: Geographical Association .

Roberts, M. (2013). *Geography Through Enquiry. Approaches to teaching and learning in the secondary school.* Sheffield: The Geographical Association.

Shulman, L. S. (1987, February). Knowledge and Teaching: Foundation of the New Reform. *Harward Educational Review, 57*(1), p. 21.

Schuman, L. (1996). *Perspectives on Instruction.* Retrieved February 18, 2008, from SDU - educational technology: http://edweb.sdsu.edu/courses/edtec540/perspectives.html

Slavin, R. E. (2012). *Educational Psychology. Theory and Practice.* Upper Saddle River: Pearson.

Sobotová, M., & Sobota, K. (1996). *Zeměpisný náčrtník.* Praha: Nakladatestlví České geografické společnosti.

Spalová, K. (1931). *Metodika zeměpisu.* (2. nové upravené vydání. vyd.). Velké Meziříčí: Nakladateství Alois Šašek.

Spalová, K. (1933). *Zeměpis prací tvořivou. (Teorie i prakse.).* Velké Meziříčí: Nakladatelství Aloise Šaška.

Uhlenwinkel, A. (2014). Factual knowledge and conceptual understanding. *Geography, 99*(Part 1 Spring 2014), pp. 28-35.

Vávra, J. (2007). *The Concept of Place in the U.S. NGS and the Czech Geographical Curriculum.* London: IGU, Commission for Geographical Education, British Sub-Committee with HERODOT.

Vávra, J. (5. květen 2011). *Proč a k čemu taxonomie vzdělávacích cílů?* (Výzkumný ústav pedagogický v Praze) Získáno 5. květen 2011, z Metodický portál: Články: http://clanky.rvp.cz/clanek/c/Z/11113/proc-a-k-cemu-taxonomie-vzdelavacich-cilu-.html/

Vávra, J. (2012). Concept of Demographic Transition Theory in Geographical Curriculum of Primary and Secondary Schools in the Czech Republic. (H. Svobodová, Ed.) pp. 163-171. Retrieved from http://www.ped.muni.cz/wgeo/soubory/Ruzne/SBORNIK-tisk.pdf#page=165

Vávra, J. (2013). *Poznávání a poznání ve výuce českého (gymnaziálního) zeměpisu II: styly a strategie.* Získáno 20. duben 2013, z RVP, Metodický portál: http://clanky.rvp.cz/clanek/c/G/17203/poznavani-a-poznani-ve-vyuce-ceskeho-gymnazialniho-zemepisu-ii-styly-a-strategie.html/

Vygotsky, L. S. (1978). *Mind in Society. The Development of Higher Psycholgical Processes.* President and Fellows of Harvard College.

Waugh, D. (1995). *Geography. An Integrated Approach* (2nd edition ed.). Walton-on-Thames Surrey: Thomas Nelson & Sons Ltd.

Waugh, D. (2009). *Geography. An Integrated Approach* (4th edition ed.). Cheltenham: Nelson Thornes Ltd.

White, A. (2008). *From Comfort Zone to Performance Management. Understanding development & performance.* Baisy-Thy: White & MacLean Publishing.

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