CONCEPT OF WORKING WITH MISTAKES IN THE EDUCATIONAL PROCESS

[a]GABRIELA PETROVÁ, [b]NINA KOZÁROVÁ

Constantine the Philosopher University in Nitra, Department of Pedagogy, Dražovská cesta 4, 949 74 Nitra, Slovak Republic, email: [a]gpetrova@ukf.sk, [b]nina.kozarova@ukf.sk

Abstract: This paper discusses modification of teaching strategies used in the educational process. In their work the authors focuse on development of the students' metacognitive skills in the educational process and mainly underpin strategies that work with mistakes commonly made during the learning process and the course of instruction.

Keywords: metacognition, mistakes, strategy, mental map, misconception.

1 Introduction

Teaching strategies in the educational process represent key aspects of contemporary education. They must be in the centre of attention because they encourage increasing the effectiveness of the educational process.

In the first place, teachers should find out *how* their students learn, *how* do they remember information, *how* do they plan their studying, retrieve information from their memory and *how* do they decide, think and use individual cognition processes.

The contemporary education system could be mainly criticized for focusing on educational outputs and not on the process that takes place during acquisition of knowledge. Students are not led to systematically study from one class to another. There is not enough room for repetition of topics; the teachers concentrate on identifying mistakes with no follow up on these during further instruction.

The contemporary education system increasingly prioritizes use of ready-made information before the time-consuming process of individual retrieving and working with information by the students. The existing teaching and learning environment in our education system is far from corresponding to current needs and is a total mismatch to the educational requirements of the near future. Slovakia scores behind other European countries in international testing and lags behind in the use of innovative trends in pedagogical practice.

We believe that the structure of the educational process should systematically keep the brains of students busy. In spite of recent developments in the field of education and the use of modern didactical concepts of education, many students continue to struggle when selecting suitable learning strategies. As Schraw (1998) describes, individual strategies based on the enhancement of students' metacognition allows for compensating of deficits in general intelligence.

Many students do not have full-fledged learning/study strategies. As a result, they do not know how to study efficiently; are unable to solve problems presented in education; do not complete tasks; and have bad study plans. However, there are also students who have mastered a wide spectrum of learning strategies that allow them to effectively study and successfully plan their educational activities. The fact is that individual teaching strategies are always influenced by the students' attitudes combined with their metacognitive disposition. This opens room for active intervention by a teacher. It is up to the teacher to use the widest spectrum of effective teaching strategies in their classes. Students will then be able to choose from a broad spectrum of presented strategies that are the most suitable from the point of view of the subject or topic of study.

It is quite unfortunate to think that within today´s educational reality memorizing and transmissive teaching will prepare the students for the modern world. There is an overload of information in our societies. If we want the pupils and students to succeed in the future we need to encourage them in critical thinking and adequate responses to emerging situations.

We believe that development of critical thinking in students has an essential impact on their learning process since it is primarily a *system* (focusing one´s attention on logical connections, organization/structuring of information); metacognition (improvement of one´s own thinking method); questioning; natural curiosity; working with mistakes; development of higher intellectual operations and activity. Summarization of scientific perspectives on critical thinking has led us to conclude that critical thinking actually means deliberating about information (to understand it, to make conclusions) with a certain intention (to achieve a result, solve a problem, complete a task, achieve a set goal).

2 Mistakes in educational process

Even small children are told that making mistakes is a bad thing. Over the years, everybody comes to the conclusion that only knowing the correct answer leads to good grades, success and right-life decisions. On the other hand, making mistakes represents a natural part of human life, since erring motivates humans to do things differently, better, more successfully. It is of paramount importance that both students and teachers in the educational process understand the principal difference between a goal to *learn something* and to *perform*.

Many students see mistakes as a threat to their self-image; thus they tend to focus only on those activities they have mastered well so that they are sure not to make mistakes, to work hard or even to think when performing these tasks. Students, teachers or parents interpret a mistake as if they acknowledged a lower level of competency. In all educational activities there is too much focus on evaluation of performance but little attention is paid to further development of knowledge and competencies of the students. Often, students are forced to hide their mistakes rather than cope with them, acknowledge them; to understand why they have happened and how to work with them.

Working with mistakes represents an integral part of each and every learning and teaching process. Mistake identification and its interpretation should be the baseline assessment technique as well as self-assessment technique. Our educational environment continues to see examining a mistake as mostly a negative thing. Čáp (1997) notes that making mistakes is a regular occurrence at the beginning of every learning process. The teachers must refrain from perceiving mistakes made by the students as a sign of their incapability, personal traits or lack of motivation. The teachers must be able to work with these mistakes and use them for the benefit of both the teacher and the students.

The recommendation of Helus (2001) can be seen accordingly. He suggests that an educational system needs to cease focusing on negative assessments. The author believes that pointing to students' mistakes can lower their self-assessment. Instead, attention should be paid to identifying a mistake at the beginning of the educational process so that it does not get anchored.

Making mistakes is a regular event at the beginning of almost each learning and teaching process. The teachers should be able to work with students' mistakes and use them for improvement of the further course of instruction. Identifying mistakes in natural sciences (mathematics, physics, and biology) or languages is easy but to identify, analyse and interpret incorrect thinking or judgement is a relatively demanding exercise. Moreover, teachers can also err, for instance in students´ assessment, when they do not precisely follow the pedagogical norms or are not sure if the performance of their student is correct or not. In such instances, the space for so-called *creative mistakes* opens when the teacher should let the students explain their thinking or the procedure they have used. Then they should

discuss things that are not clear, interpret them, and concentrate on questioning and thorough analysis of the discussed matter.

Mistakes always open a new perspective on problem solving and tasks and offer new experience that both the teacher and students can utilize in planning further steps. Mistakes should be primarily seen as indicators of gaps in the learning process. By no means should students be punished for their mistakes, neither through assessment or verbally – it would only cause them to be afraid of potential intimidation. When a student actively tries to identify mistakes and corrects them, he or she gathers new knowledge for further studies.

2.1 The concept of working with mistakes eduction

Didactics of education is closely linked to working with mistakes. A goal-oriented didactical approach focused on goal achievement offers detailed specification of performance requirements that makes identification of mistakes easy. With a didactical approach focused on activities, there are usually no or few performance requirements, which makes the identification and analysis of mistakes more of a comprehensive exercise (V. Kosíková, 2011, p. 139)

Each mistake needs to be identified and corrected at the very beginning of the learning process. If a student internalizes an incorrect meaning and then reuses it, reversing and correcting such an *established* (rooted mistake) becomes a long term, not always successful process. Thus, teachers need to use feedback and monitoring of their students during the educational process. Each student reacts differently to information about a mistake and its correction at the beginning vs. the end of the learning process. At the beginning of the learning process, concepts do not yet have a stable position and their mutual positions/interconnections are only being identified and explained. At this stage, a possible mistake is not deeply rooted, which makes it easier to eliminate it. In the course of learning students continuously work with new concepts; practice and repeat acquired knowledge; thus a wrong piece of information may become a part of an established and reinforced knowledge structure.

Four basic steps need to be considered in working with mistakes: mistake identification; mistake classification (looking for causes, accidental mistake vs. not understanding of a subject, assessment of its gravity); mistake explanation; and interpretation and mistake correction. In traditional schooling, the more mistakes a student makes, the worse grade he or she gets. This reinforces a stereotype: mistake = failure (and subsequent reprimand). When students invest all their thinking into their failures and wrongdoings they have no room to think how to fix things. As a result, they repeat the mistake since they do not know what to do in a situation where the mistake has already happened. It is wrong when teachers punish their students for their mistakes since it only brings fear and efforts to avoid similar failure. This organization of teaching, focused on mistakes, can only result in further erring and failing. A proper focus on correcting mistakes, however, allows understanding mistakes as integral part of the learning process that can be used to the benefit of an individual student and all students.

Analysing mistakes always leads to a profound experience that enables students to better remember new knowledge. Every teacher should always use mistakes as a learning tool. The teachers should encourage their students to identify mistakes on their own, try to explain why they made them and interpret the subject matter in such a way that they avoid making mistakes in the future. That requires an explanation of mutual relations among things and logical connections. Mistakes in the learning process should be welcomed for their high information value about the real level of students' knowledge. The saying *learning from mistakes* is not purposeless. This approach to instruction also supports trust, cooperation and joy from the work between students and teachers.

Traditional instruction is literally fighting mistakes. They are always identified as *unwanted events* that result in a lower score in written exams and potential mockery from classmates. The teachers are upset when students make mistakes and often they take it as a personal failure. Students involuntarily end up in a situation when they would rather do nothing than make a mistake; notwithstanding when the same mistakes repeat over again or teachers are afraid of making a mistake in front of their students. Teachers tend to be more focused on identification of mistakes and their correction and not their cause and thorough elimination. The community of parents also believes that mistakes are essentially unwanted phenomena.

A mistake, nevertheless, is a much more complex attribute that activates and encourages independent thinking in students. We should therefore focus on identifying causes of mistakes, not the mistakes themselves as this will support progress of both students and teachers. It is of no help to a student if a teacher only corrects his/her mistake and pays no more attention to the matter. Mistakes must not deter or scare the students; they should be perceived as a useful experience. If a student errs and feels bad about it, or is even afraid, the teacher should offer encouragement and admit he/she sometimes makes mistakes, while always trying to identify the cause leading to that mistake. It is actually appropriate when a teacher thinks aloud and analyses the causes of a mistake. The students then see possible ways of working through mistakes. Whenever a mistake occurs, it is a teaching opportunity because mistakes support and develop a search for alternative solutions, divergent thinking and creativity.

Slavík (1999) differentiates between a normative and creative mistake. A normative mistake is a certain deviation from standardized performance that is considered to be correct. A creative mistake represents a rigid perspective on each and every idea of a student that contravenes his/her requested performance. Humanities use analysis, correction and assessment of incorrect performance by students as a tool allowing for comprehensive assessment of the knowledge system of individual students.

3 Mental mapping

Illustrating knowledge through visual systems is a technique used in education from the ancient times. Since 1972 it has been used as a tool for examining significant changes. In 1965 it was a German pedagogue, Richter, was the first one in the European geopolitical context to examine how the subject of teaching is structured. Graphic organizing of concepts and their mutual connection is nowadays most often connected with J. D. Novak (1998).

We primarily believe that each educational activity should first and foremost contribute to and facilitate organizing of the students´ thinking; namely structuring of the concepts the student uses. Individual knowledge of human beings is based on a strong semantic network connecting individual concepts into patulous mental concepts. These concepts are created through connecting individual concepts (a concept represents an idea about its content) with those already existing in the network with new concepts.

Graphic organizing of concepts and their relations into a visual form is called mental mapping. When working with a map, the process of map creation is much more important than the final mental map since working on the mental map enhances key competencies including: problem solving, learning (ability to define main idea and prioritize other ideas), social competence, and personal and communication competence.

Mental maps can be used in almost all subjects and all stages of a class. They can serve as learning motivation; an innovative way of evaluating teaching performance or as review when a study area is completed. Mental maps can be analysed from various perspectives. When a mental map is created, the student is an active participant in the instruction. Moreover, the student can contribute with an important personal perspective into the

structure of a text. Mental mapping can be used in all areas of instruction, though it is important to differentiate among different types of maps. There is not a map that would be universally applicable for all teaching materials.

3.1 Preconceptions and misconceptions

Conceptual learning – no doubt – is a challenging exercise. Contemporary education builds on the knowledge of cognitive psychology that pays long-term attention, for instance, to the formation and correct understanding of concepts in children. The concepts are units of individual mental structure, thus identification of results in conceptual learning has not yet been clarified. Identification of the internal knowledge system of a child – his/her understanding – is a challenge. Most frequently, the literature uses the terms *concept, student´s understanding, student´s idea, naive theory,* and *misconception.* The very last concept is used to define a student´s incorrect understanding of a subject or its incorrect interpretation.

A human being is subject to various external influences from the early stages of life (culture, religion, economy, and social influence), endogenous influences (individual predispositions) and personal experiences. Information *collected* in this way in combination with knowledge, represent the personal internal knowledge system. This system can vary from person to person in terms of flexibility, structuralism and scope. The structure of an internal knowledge system represents its important component. It consists of association bonds among individual pre-concepts. The way the system is formed and semantic networks are established significantly unveils how we learn the content of individual concepts, how do we apply concepts in real life, and how we modify new concepts based on the preconceptions.

The form of understanding of any subject may change and develop over time. In this context, by understanding of a subject we mean the process prior to facilitation of the content of a specific subject in the educational process (preconceptions and working with them) during facilitation (the student first acquires new knowledge on concepts and their mutual relations), during facilitation (the student acquires new knowledge on concepts and their interconnections) and afterwards (reconstruction of previous knowledge, enrichment of an internal knowledge system by new generalizations, interconnections and concepts).

Richter (1998, p. 48) identified the main factors that impact a student´s understanding of the subject: the authors of a textbook (low level of comprehensibility, text difficulty, uninteresting tasks), the students (low attention span during instruction, wrong teaching method), the authors of the curricula (wrong choice of subject area, ignoring links among subjects, wrong structure of the subject), the teacher (unstructured explanation, incomprehensible vocabulary and insufficient analysis of concepts, unpopular topic, reproduction of the subject).

In the words of Pupala (2001, p.145), preconception is the first, unsorted idea created by a human cognitive activity; while a human being adjusts the world so that it is meaningful; preconceptions are coherent explanatory systems. Children develop their internal knowledge system from knowledge and information stored in long-term memory. It is a particularly rigid system since it builds on stable platforms of the child´s cognitive processes. Some pieces of information stay there for the length of life, even if they are not necessarily true. Modifying an internal knowledge system of a child is therefore a very challenging and long-term process since the knowledge must be confronted with facts that prove it wrong.

There are many determinants behind creation of misconceptions, including personal experiences of each student, emotions added to specific information, mistakes in texts or textbooks, shortcomings of the home environment or prejudices and stereotypes.

We understand misconception as a wrong idea, incompatible with the current level of accepted scientific knowledge. It is obvious we need to identify students' preconceptions and misconceptions prior to instruction of a new topic. Teachers should be aware of this fact and deal with it. Moreover, they can use the students´ preconceptions and possible misconceptions as a motivational factor during instruction. Motivated students can then, through individual pedagogic situations, work with their ideas, modify them and compare them with others. Students thus become the main creators and systemisers of their own internal knowledge system.

As stated above, determinants in developing misconceptions include mistakes in the text, in the school environment, mistakes in the textbooks, including factual inaccuracies and overly simplifying or incorrect explanations and interpretation of concepts when logical links among individual pieces of knowledge disappear. Often, students are presented only with summary tables or theorems they need to learn without understanding or deeper analysis. The number of topics for instruction is increasing but the length of a class and academic year remains unchanged. Subject areas are not challenging for their content but for missing associations, logical interconnections and links among individual topics. Students do not think about the subject, they just passively reproduce readymade knowledge, often in the same words their teacher had used in the class.

4 Empirical part

The empirical part of this paper is primarily based on psycho-didactical, meta-cognitive and neuro-scientific knowledge and perspectives on the process of instruction. There are only a handful of experts in Slovakia who systematically deal with those aspects of education who work with mistakes for the sake of developing metacognition within students. This paper is a contribution to implementation of metacognitive learning strategies into the educational process which will enable every student to further develop his or her current level of metacognition.

Metacognition is a concept that gradually has found its way into the awareness of teachers and psychologists and at much slower pace also to the lay public. Contemporary education pays attention to the metacognitive processes mainly in text comprehension. However, there is a need to gather more empirical data for implementation of metacognitive strategies and theories into curricula, teaching and instruction.

4.1 Research goal

The study aims *to create and verify a self-correction tool based on metacognitive formulations for working with a mistake.* The research problem identifies the level of impact of the self-correction sheet on the level of knowledge and competence of the students when working with mistakes.

The research problem and goal leads to the following hypothesis:

H1: *Use of a self-correction sheet will improve study outputs of the students in developing a corrected conceptual map.*

4.2 Research metods

The following tools were used for the purpose of the research:
A self-correction sheet designed by the research team: it is a set of questions based on metacognitive formulations that work with a mistake. The self-correction sheet contains 24 questions in three basic subscales divided into the following categories: map construction, map content, and personal preferences. The categories contain the following items: map construction (time, map design, hierarchy, concepts, relations among the concepts); content of the map (study reference materials, notes from a class, substantive information on the subject, random mistakes, serious mistakes, careless mistakes); and personal preferences (stress,

learning style, subject repetition, interpretation of a mistake, work satisfaction, analysis with the students, fatigue, acknowledgement of identified mistakes, final map of concepts). The strategy for developing the self-correction sheet was relatively challenging since the sheet is based on metacognitive formulations while it was also important to consider age-related specificities of the students.

The applied research method was *experiment* – in order to apply and verify the effectiveness of the self-correction sheet based on metacognitive formulations in eliminating mistakes in the experimental group. The results of the students in the experimental group were compared with the results of the control group that did not have the self-correction sheet available during its class.

Test of conceptual mapping – the method of logical synthesis and analysis was used for evaluating individual conceptual maps of the students in the experimental group and in the control group. The evaluation criteria for collected data allowed us to score and sort the data into several areas. The criteria included: the frequency of concepts on the map; key words of the subject area; number of hierarchies on the map; meaningfulness of the conceptual map; and final visualisation of the conceptual map. The test of conceptual mapping and selected criteria were also applied during the post test. In both cases, the students constructed conceptual maps at their own discretion, having the opportunity to choose any type of a map: circle map, bridge map, flow map, bubble map, brace map, multi-flow map, tree map, double bubble map. Students in both the control and experimental group created non-structured maps since they had only received the central concept (a word), not a fixed list of concepts.

4.3 Sample characteristics

We expect that both levels of elementary education strive to fully enhance cognitive functions of the students. A child becomes a student at the secondary school level, being an adolescent, at the age when his/her attitudes to life, society, school and personal challenges change.

Our research focuses on secondary school/secondary grammar school students. There are multiple reasons behind this choice: first, we expect that secondary (grammar) school students have had found their study style and know which style fits them best and they use the most. Furthermore, we believe that older students have a more stable structure of knowledge; therefore their conceptual maps will contain more concepts, mutual connections, inter-subject links and hierarchies.

Our research population was a group of secondary school students and secondary grammar school students. The research sample was selected from among secondary grammar school students in Nitra. The research sample consisted of two classes, with representation of boys and girls. The total number of subjects in the sample was 60 students in two classes at the second grade of a four year secondary grammar school. The students were assigned to a control and experimental group by classes. To preserve the authenticity of the research, we did not mix the groups and the students were assigned to groups within a class. Thus, they studied from the same textbooks, with the same teacher and the same curriculum. The experiment was carried out once a complete subject area was covered.

Table 1: Research participants

Class	Total	Girls	Boys
2A	30	20	10
2B	30	19	11

4.4 Results

The chosen research method, considering the research goal – *to create and verify an self-correction tool based on metacognitive formulations for the sake of working with mistakes* - was an *experiment.*
Based on a pre-test the students were divided into two groups: one group (class) was a control group and the other group (class) was a experimental group. The aim was to compare classes with very similar educational outputs, including the average score in written tests (no significant difference) or final score at the study certificate from the *history class.* The classes were similar, thus the overall output evaluation is comparable. Scoring of conceptual maps also did not find any significant differences in the quality of conceptual maps in individual groups either.

At the beginning of the experiment knowledge in selected area – *Slovaks in the Austro-Hungarian Empire* in both groups was only the knowledge acquired at elementary school. Therefore, we decided to repeat the topic through free associations. During instruction of the subject, a wide array of didactic methods was applied in both groups. The research team worked on diverse tasks with the students, discussed various issues, worked with textbooks, identified different locations on maps, worked with history articles, combined information with documentary films and power point presentations.

Individual students were observed during educational process for the needs of the self-correction sheet – how they think, type of connections they make in history subject, where the biggest gaps are, how they remember the curriculum more easily, why they cannot link some pieces of information together. Upon the completion of the topic, we asked them to do a pre-test of conceptual mapping.

After scoring and evaluating conceptual maps in both groups we identified students' mistakes, returned the conceptual maps to them, while in the experimental group the students also received the self-correction sheets to correct the identified mistakes. We were interested to find out if the criteria values or the final values in the conceptual maps would change more significantly with the self-correction sheet based on metacognitive formulations. The research then experimentally verified if the self-correction sheet designed to enhance students´ metacognition improved their study outputs when outlining a corrected conceptual map when implemented into the educational process.

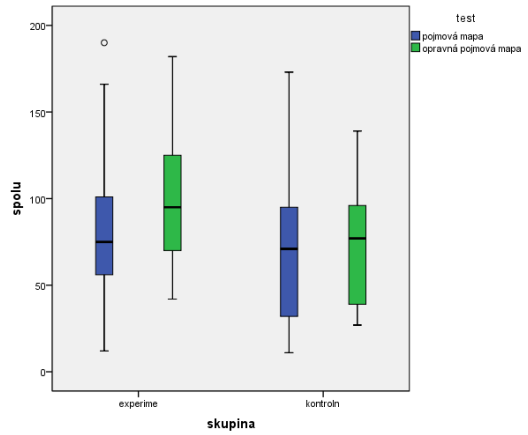
The next part of the study describes statistical findings. Hypothesis No. 1 (H1): *We expect the use of the self-correction sheet to improve the study outputs of the students when designing corrected conceptual maps* was developed into a statistical hypothesis that is to be statistically tested (using tests for mean values). The following assessment criteria were used as frequency indicators: frequency of concepts, number of hierarchies and total.

Partial hypotheses were chosen in order to find out and confirm similarities between the experimental group and control group. Both groups must have had a comparable score at the beginning of the testing otherwise the results would not be objective.

$H_{1.1}$: Total post-testing score in the test group is different.
$H_{1.2}$: Total pre-testing and post-testing score in the experimental group is different.
$H_{1.3}$: Total pre-testing score in the experimental group and control group is the same.

The following boxplot demonstrates total score distribution (i.e. total number of points) for the conceptual map and corrected conceptual map in both experimental and control groups. Testing criterion "Total" is a quantitative representation of the success rate in testing.

Graph 1: Total score distribution



The quantitative variable (Total) in both experimental and control groups was compared through non-parametric Wilcoxon signed-rank test. Since there were 30 observations in each group, when the normality presumption was not met, we used the non-parametric Wilcoxon test against the Student´s t-test.
Prerequisites for means testing must be checked prior to testing and comparison itself. The following tables show test outputs for both groups.

Table 2: Normality test - Control group pre-test

Normality test				
Control group		Shapiro-Wilk		
Pre-test		Statistic	Df	Sig.
Total		0.938	30	0.079

Table 3: Normality test - Control group post-test

Normality test				
Control group		Shapiro-Wilk		
Post-test		Statistic	Df	Sig.
Total		0.938	30	0.079

Table 4: Normality test - Experimental group pre-test

Normality test				
Experimental group		Shapiro-Wilk		
Pre-test		Statistic	Df	Sig.
Total		0.961	30	0.335

Table 5: Normality test - Experimental group post-test

Normality tests				
Experimental group		Shapiro-Wilk		
Post-test		Statistic	Df	Sig.
Total		0.928	23	0.042

Individual calculations lead us to conclude that the normality assumption is met in six cases and violated also in six cases (see Table 6).

Table 6: Normality assumption - summary

Experimental / Group	**Score**	**Normality assumption**
Pre-test – Control group	Total	Yes
Post-test – Control group	Total	No
Pre-test – Control group	Total	Yes
Post-test – Experimental group	Total	Yes

Testing of the above statistical hypothesis at the level 0.05 (i.e. with 95% confidence) brought the following results described in the following explanations. Pre-test and post-test scores in relation to the control group needed to be compared for the sake of this paper. At the individual level, it is important to compare a student´s results in pre-test and post-test. This makes individual progress in pre-test and post-test equally important to measuring and statistical processing of the results of the whole group.

The quantitative variable (Total) indicates that post-test results in the control group and experimental group differ. Since a non-parametric test was used it is not possible to conclude if the result of the experimental group was better than in the control group. The average score in the experimental group was 101 while it was 76 in the control group; i.e. the average result shows the results in the experimental group should be better than the results in the control group. This hypothesis would have been confirmed if the sample size was bigger.

Pre-test in the control and experimental group was not different. Such an outcome was predictable since the conceptual maps of both groups were the same on average. As already described, we worked with two comparable groups (classes) with almost identical educational outputs in the *history* subject.

Pre-test and post-test results in the experimental group are different. The total post-test score is higher than the total pre-test score. The students in the experrimental group corrected identified mistakes, thus achieving a better score. Their corrected conceptual maps contained more concepts with a higher level of meaningfulness.

The Pre-test and post-test score is different in the control group. The average post-test score was also a little higher than the average pre-test score. A potential explanation is the short time period between both tests.

The use of the self-correction sheet improved study outputs of the students when making corrected conceptual maps. There were significant differences in pre-test and post-test results in the experimental group. Individual improvement of each student in individual scoring criteria is an important result for the sake of design and verification of an self-correction sheet. The results show that all students in the experimental group demonstrated positive changes in most of the followed factors. This self-correction sheet, based on metacognitive formulations, was designed and experimentally tested in the educational environment. Since it is a certain type of a generic questionnaire not specifically bound to a selected topic or subject, it can be used with any course (subject). We would also recommend testing of the self-correction sheet with a larger research sample when students cover a more extensive thematic area. The contemporary education system does not focus only on acquiring knowledge but primarily on its quality, which potentially can be modified through enhanced metacognition in working with mistakes.

4.5 Conclusion

From the beginning of 20th century our school system has faced a long-standing problem – overloaded curricula and an encyclopaedia-like didactic approach. Fast technological, social and cultural changes in a globalized world unavoidably lead to adaptation by people to social developments and living conditions.

A metacognitive approach to educational practice does not only focus on performance but also on students´ personal and social development. Taken from a metacognitive perspective, teachers often complicate the students' learning process, albeit unconsciously, rather than making it easier. Teachers must be informed about the ways learning and teaching mechanisms function and how to increase the learning effectiveness of their students.

We attempted to explore this area more profoundly, trying to explore students´ capacity to work with mistakes and enhance their metacognitive capacities by doing so. Metacognition helps students to become active designers of their learning process and the constructors of their internal knowledge system. Metacognition of the students appears to have improved through

their work with mistakes when using a self-correction sheet in the educational process.

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