Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.6, No.22, 2016

Impact of Practising on Development of Critical Thinking

Hana Rusi Saliu,
University of Tetova,
St. Ilinden pn,1200 Tetovo, Macedonia
hana.saliu@unite.edu.mk

Myqereme Rusi,
University of Tetova,
St. Ilinden b.b.,1200 Tetovo, Macedonia
m.rusi@yahoo.com,

Violeta Arnaudova
University “Ss. Cyril and Methodius”,
Bulevar 'Krste Misirkov' b.b. 1000, Skopje,Macedonia
violeta.arnaudova@hotmail.com

ABSTRACT
In the present day people are surrounded with a lot of information and different ways of receiving this information. Today at the same moment the information is spread, it becomes available on the other corner of the world. Because of these reasons the educational system in many countries of the world has changed. One of the skills that can help young people to select numerous information is their critical thinking ability. In this paper the impact of exercise on development of critical thinking has been researched. This research was conducted by the experimental method. The research sample consisted of 50 subjects in the experimental group and 50 subjects in the control group. The exercise of critical thinking is done through three techniques for the development of critical thinking such as: diagram of the main question, the scale of arguments and interpretation of academic language. For the measurement of critical thinking is used the test WGCTA (Watson-Glaser Critical Thinking Appraisal). The results obtained show that the experimental factor affects the development of critical thinking, which means exercising critical thinking contributes to the development of this ability. The conducted survey should help in creating a program with practical exercises that will help future teachers to influence the development of critical thinking of their students.
Key words: critical thinking, development, impact.

Introduction

The need of empowering young people to live in an environment of rapid change and expansion of information is becoming more emphasized. More than ever, today's young people need the ability to solve problems, to review opportunities critically, to evaluate alternative solutions and make thoughtful decisions.

In such conditions of life, the factual knowledge quickly loses its value. Phillips points out that (Phillips, 1992 according to Лазареска и Ангелеска, 2004) most of what we now know is usable for the next 10 years or even less, and then becomes unusable or obsolete information.

From here emerges the need for an active attitude of teachers in the preparation of students for life in the future. As an imperative in this regard is the need to foster the skills for critical thinking. "Students who think critically relate what they have learned from their own experience, compare it with the results of other authors, draw implications, construct new examples, think about solutions of problems, ask questions and seek answers, investigate the causes and consequences, show skepticism, argumentatively defend their position and carefully consider the arguments of others" (according Lazareska and Angeleska, 2004).

The main basis for the development of society is a developed school, which offers insights to assist in practically solving many problems. The contemporary trends in the development of democratic society are directly reflected in upbringing and educational activity. Starting from the conception, goals and tasks of education, curriculum, textbooks, training of teaching staff, as well as other factors in this area, arises the need that students in our schools should be educated in the spirit of critical observation of phenomena, conditions, and information they receive at school and out of it (Abazi, 2003). Many studies show that there is a huge interest in the transmission of information, but unfortunately, the regular school classes pay very little time to teaching of thinking. In that sense, Walter Parker (1991, according to Case, & Daniels, 2001 p. 234) points out that learning which includes thinking represents "more desire than exercise."

A great number of factors contribute to dissatisfaction regarding the situation that is present in our schools about critical thinking. One of them is the lack of knowledge as how to encourage students to think and how to encourage them to learn the teaching material.

In the world today, it is insisted to overcome this situation at school particularly by overcoming the situation of teachers transferring numerous formulated information. Instead, it is insisted on teaching which aims to empower students to think independently. Education should empower students to learn how to learn, using mostly the thinking process. Such an approach towards learning has benefits that can be seen in the critical spirit of students. Without enough critical thinking we could not say that people are educated enough despite their academic degree (Facione, 2007).

Activities related to the development of critical thinking first took place in the United States. In recent years, the ideas for the development of critical thinking skills spread to other countries, with a special reflection on the university education. The analysis of the programs of the twenty best universities in the world published on the website of the Academic Ranking of World Universities 2007 have shown that more or less all deal with different aspects of critical thinking. Some are focused on the development of critical thinking skills (University of Pennsylvania, Oxford, Cambridge and Columbia University), others, learn critical thinking within a particular content (Cornell University, Harvard, Stanford, etc.) (Grozdanić, 2009). From this we can conclude how much importance is given to critical thinking, and especially to its development in the world's best universities.

The conducted survey should help in creating a program with practical exercises that will help future teachers to influence the development of critical thinking of their students.

The main goal of this research is to identify the effects of encourage the development of critical thinking skills, with a practising program chosen by the author, despite its natural development.

This research aims to explore the problem:

1. Whether the development of critical thinking depends on practising critical thinking skills?

Research variables

Dependent variable

Critical thinking: Critical thinking is the ability focused on the thinking review of the problem and the matter which enters the frames of personal experience, knowledge on the method of logical research and reasoning, the ability to provide and evaluate the arguments. Critical thinking will be measured by Watson - Glaser test WGCTA. This test does not measure all aspects of critical thinking, because the concept of critical thinking is very wide, but it is a good measure of our understanding related to what is critical thinking and it measures the skills that are practised in this experiment.

Independent variables

Experimental factor (practising)

For the purposes of this research, to induce change in the critical thinking skills, in the experiment is introduced the experimental factor (practising) - as an active independent variable. The experimental factor consists of three exercise techniques which presumably could lead to the development of general critical thinking skills. The techniques that were used are: *a diagram of the main issue,* which technique contributes to mastering the ability of evaluation, *persuasion scale (a visual scaffold)* which contributes to improving the skills of argumentation and *table of interpretation of academic language* which served to practise the interpreting skill (Zwiers, 2006). This factor varied with presence - absence. In the experimental group, we have presence of the experimental factor, while in the control group we have its absence. In addition we will explain the three skills of critical thinking, by which the stimulation of its development is achieved.

Research hypotheses

Hypothesis:

The level of development of critical thinking is higher with subjects exposed to practising critical thinking skills than with subjects not exposed to practising critical thinking skills.

METHOD

Subjects

The population of this research is represented by the students of social sciences while the available population are students of Psychology and Pedagogy. The sample of subjects in this research consists of Ist year students of SUT (State University of Tetova). In the initial measuring, all students of the available population were included, both, psychology and pedagogy study groups. The total number of students tested in the pretesting was 200, of which 100 were psychology students and 100 were pedagogy students.

The included students in the experiment were divided into two groups: experimental and control group. The groups - experimental and control are formed by equalizing of distributions. Both groups were equalized according to the achievements on the test to measure critical thinking (WGCTA), intellectual skills (Domino - 48)

and the test for measuring the motivation of achievement (MOP). Intellectual skills and motivation of achievement were two relevant variables. According to the pretest results, random subjects, once formed the experimental group, then after the calculated M and SD the control group was formed. These subjects were selected from 200 tested subjects. They were tested for critical thinking in order to control the factors which can influence on the internal validity of the research. The distribution of the subjects of the experimental and control group, by study group and gender, is shown on the table. (Table 1)

Table 1. The number of the students in both research groups shown according to the study group and gender.

		Experimental Group		Control group	
Study group	N	Male	Female	Male	Female
Psychology	64	2	32	4	26
Pedagogy	36	1	15	1	19
N	100	3	47	5	45

Measuring instruments

Watson - Glaser (Watson - Glaser) test to measure critical thinking WGCTA

WGCTA consists of a series of five subtests that require the application of analytical thinking skills. The items on the test are made from articles taken from newspapers, magazines or electronic media, including comments and statements which should not be unconditionally accepted or at least, without a degree of critical evaluation.

We said above that WGCTA is composed of five subtests and each subtest is comprised of 16 statements. Theoretically, the lowest score of each subtest is 0, while theoretically the highest score that can be achieved in every subtest separately is 16.

Results

To test the hypothesis set in this study we used several statistical indicators, whose results will be presented and interpreted in this part of the paper.

Analysis and interpretation of results will begin by reviewing the descriptive data of the experimental and control group in pretesting and posttesting, where the results for the lowest and highest score will be shown, obtained at each test that was applied in the research, arithmetic means and standard deviation of critical thinking.

We will review the results of the differences in arithmetic means found from pretesting and posttesting of the experimental and control group for the variable critical thinking. All results will be presented in tables and charts.

Descriptives for the experimental and control group pretest and posttest situation

The analysis of the tests results will begin by reviewing the descriptive data of the variable *critical thinking.* By analyzing the descriptive data we intend to show that the **experimental and control group** in the pretest do not differ among themselves in terms of the variable included in the research.

From the descriptive analysis of the results of the experimental and control group we have data on the lowest and highest score of critical thinking in pretesting (which is 25 for the experimental group, while 27 for the control group, the highest score achieved in pretesting for the variable critical thinking, which is 49 for the experimental group, while 48 for the control group).

Table 2. Descriptive data of the experimental and control group in pretest situation on the variable critical thinking

		N	Min. achieved Score	Max. achieved score	M	SD
Critical thinking	E	50	25	49	36.04	5.2
Pretest	K	50	27	48	35.78	4.75

From Table 2 it can be seen that the lowest and highest scores achieved on critical thinking, in the experimental and control group are approximately similar, which means that both included groups in the research

have similar arithmetic means and standard deviation in terms of the research variable in pretest situation. This information points out the fact that the subjects who were involved in the experimental and control groups did not differ among themselves in terms of critical thinking in the beginning of the study.

Table 3. Descriptive data of experimental and control group in posttest situation on the variable critical thinking

	N	Lowest score	Highest score	M	SD
E-posttest	50	30	52	39.36	5.28
K-posttest	50	24	45	35.92	4.88

In Table 3 are presented descriptive data on posttest situation on the variable critical thinking for the experimental and control group. The lowest score of the experimental group in posttesting for the variable critical thinking is 30 (points), while the highest 52 (points). If these results are compared with the descriptive results in pretesting regarding the experimental group indicated in Table 2, we see that the difference between the lowest scores achieved in this group is greater than the difference of the highest scores (lowest scores 25-30, highest scores 49-52). As for the control group, the lowest score of this group in posttesting for the variable critical thinking is 24 (points), while the highest 45 (points). If we analyze the results of the control group in terms of pretesting (presented in Table 2) and posttesting, we will notice that the second measurement (posttest situation) at the lowest and the highest score shows decrease compared to pretesting (lowest scores 27-24, highest scores 48-45). Furthermore, when comparing the experimental and control group we can notice differences both, in the lowest and highest scores in favor of experimental group. This difference can be seen in arithmetic means and standard deviation of both groups in posttesting (Table 3). But to determine whether these differences are statistically significant, we will test the significance of differences between arithmetic means of experimental and control group pretest and posttest situation.

Results from ANOVA and t-test between experimental and control group in pre/post-testing on the variable critical thinking

One of the goals of this research is to determine the significance of the differences between the arithmetic means of the research variable.

Table 4. ANOVA for pretest situation between experimental and control group on the variable critical thinking

	SS	df	MS	F	Sig.
Between groups	0,36	1	0,36	0,01	0,906
Within groups	2497,60	98	25,48		
Total	2497,96	99			

Table 4 shows the results of the conducted ANOVA. From the obtained results we can determine that there is no statistically significant difference between the experimental and control groups in pretesting. Both groups in pretesting have been shown to possess the same level of critical thinking.

To test the hypothesis of this research, we conducted several statistical procedures. One of these procedures is ANOVA for repeated measures and the other indicator is t - test regarding pretest situation for the experimental and control group on critical thinking. In the following table (Table 5) we will show the results of the t - test for the variable critical thinking in pretest situation.

Table 5. Significance of differences in arithmetic means between the experimental and control group during pretesting (E1 – K1) on the variable critical thinking

		Exper. group		Control group		
Variables	N	M	SD	M	SD	t
Critical thinking pretest	100	36.04	5.20	35.92	4.88	0.12

To determine whether groups differ with respect to the variable included in the research, we tested the significance of differences between arithmetic means of the experimental and control groups for critical thinking in pretest situation. In pretest situation E-pretest - K- pretest (Table 5), the two groups did not differ significantly

according to the level of the manifested critical thinking, because the obtained value for t - test (t(98)=0.12) does not exceed the standard values for statistical significance (t = 2.01 level p 0.05 and t = 2.68 level p 0.01).

In the following table (Table 6) we will show the results of the conducted t - test for critical thinking among subjects in different test conditions. These conditions are:

a) Where critical thinking is developing under the influence of the experimental factor - practising critical thinking skills;

b) Where thinking develops naturally.

By establishing that there are significant differences in critical thinking among subjects exposed to different test conditions, we aim to test the hypothesis of this research, which states:

The level of development of critical thinking is higher with subjects exposed to practising critical thinking skills than with subjects not exposed to practising critical thinking skills.

Table 6. Significance of differences in arithmetic means between pretest and posttest situation of the experimental and control group (Epretest-and Eposttest Kpretest-Kposttest) for the variable critical thinking.

		Pretest		Posttest			
Groups	N	M	SD	M	SD	df	t
Experimental	50	36.04	5.20	39.36	5.28	49	4.53**
Control	50	35.92	4.88	35.48	5.07	49	0.61

In Table 6 are shown the results of testing the significance of differences in arithmetic means on the variable critical thinking of subjects from the experimental group in a situation when arithmetic means of the pretest and posttest situation of this group are compared. Moreover, arithmetic means achieved by the control group in the pretest and posttest situation are compared as well. From the results presented for the t - test it can be noted that the value of the t-test for the experimental group exceeds the standard values for statistical significance (t = 2.63 for level r 0.01) and is t(98)=4.53. From the same table it can be seen that there is no statistically significant difference in arithmetic means of the control group in the pretest and posttest situation. The obtained value of t-test does not exceed the standard values for statistical significance. The data indicates that, in terms of critical thinking, the experimental group in the posttest situation compared with pretest situation achieved statistically significant difference, indicating that the critical thinking of subjects from the experimental group improved and the experimental factor – practice contributed to that improvement. But to validate the significance of the hypothesis conducted ANOVA (Table 7) and tested the significance of differences between arithmetic means between the experimental and control groups in terms of posttest - situation (Table 8).

Table 7. ANOVA between experimental and control group for the posttest situation regarding the critical thinking variable

	SS	df	MS	F	Sig.
Between groups	376,36	1	376,36	14,00	,000**
Within groups	2634,00	98	26,87		
Total	3010,36	99			

Table 7 presents the results of the analysis of the variance in regard of the variable critical thinking between the experimental and the control group. From the given data we can determine that there is a statistically significant difference between the experimental group, which was exposed to the experimental factor – practice, and the control group in terms of critical thinking ($F(1;98)=14.00$ $p > 0,01$). From this data we can determine that the experimental factor influenced the development of critical thinking, because the experimental group, compared to the control group, achieved statistically higher results in terms of critical thinking.

Table 8. Significance of differences of arithmetic means between the experimental and control group for the variable critical thinking in posttest situation (E-posttest-K-posttest).

Groups	N	M	SD	df	t
Experimental group - posttest	50	39.36	5.28	49	3.74**
Control group – posttest	50	35.48	5.07	49	

Legend:

- **N** – number of subjects in each group
- **M** – Means
- **SD** – standard deviation

Table 8 shows the results of the significance of differences between the arithmetic means of the experimental and control group in the second testing (E2-posttest - K2-posttest) to see if the natural development has affected the development of critical thinking or it is as a consequence of the experimental factor. From the values shown in the table it can be seen that the obtained result of the t-test exceeds the standard values of statistical significance and it is t(98)=3.74 which means that the development of critical thinking differs significantly in both groups included in this research, and it implies that the experimental factor - practice affects its development. The experimental group which was exposed to practice, at the second measurement of critical thinking has shown statistically different results compared to the control group which was not exposed to practice. Differences are significant at the significance level p<0,01. Results similar to ours are found by other researchers. Edwin Glaser (Watson, & Glaser, 2002), Richard Paul and Debbie Walsh (Walsh, & Paul, 1986), Kvaščev (Kvaščev , 1977) and other scientists who based on their research on the development of critical thinking claim that it is a skill which needs to develop, and this can be achieved if students (pupils) practise on how to think critically.

Differences between pretest and posttest situation for the experimental and control groups in terms of changes that have occurred in critical thinking under the influence of the treatment (experimental factor) are given in graphical form in Chart 1. As for the experimental group between pretest and posttest an increase is noticed. The results of the experimental group obtained at the posttest are significantly higher compared to the results obtained in the pretest on critical thinking. The chart shows that there is no difference of the control group on critical thinking which was measured by Watson - Glaser test between the two measurements. Also, it can be seen from the chart that these two groups of subjects in the pretest did not differ in terms of critical thinking. Both experimental and control group were included in the research with similar achievements on the Watson - Glaser test. In the experimental group, after the pretest, the experimental factor (practice) is introduced that was intended to stimulate the development of critical thinking. The control group was not exposed to the experimental factor. Chart 1 indicates that the experimental group had positive changes in posttest in terms of critical thinking compared to the control group.

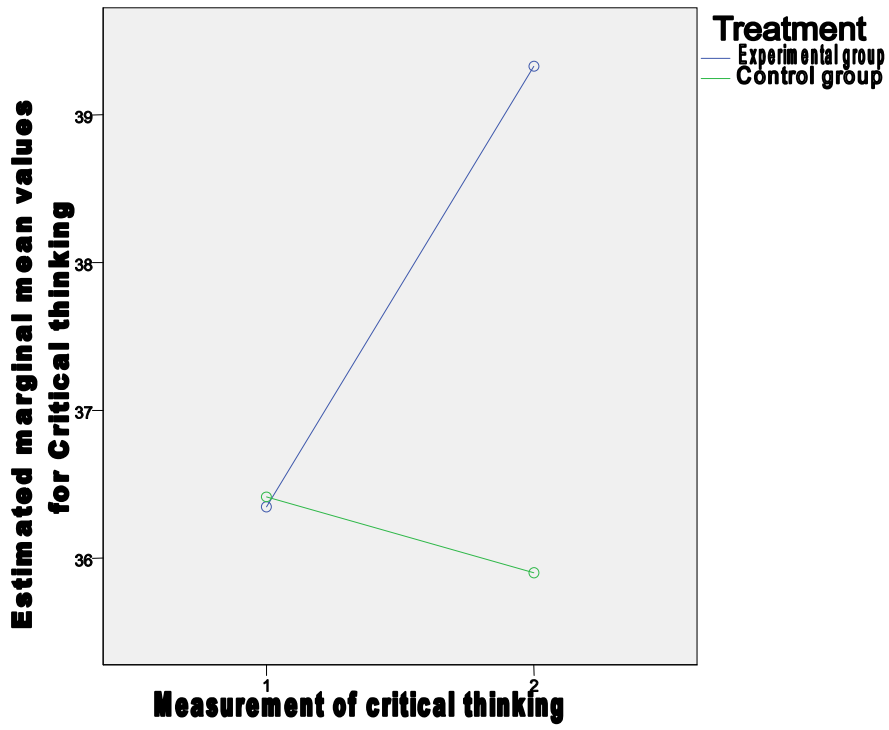

Chart 1. Achievements of the experimental and the control group on the test on critical thinking in pretest and posttest situation (E pretest – E posttest and K pretest – K posttest)

Almost all tests that measure critical thinking accomplish that through measurement of different skills of the critical thinking. Most psychologists think that under the influence of one experimental factor, more skills of critical thinking can be developed. Even the test used in this research for measuring the critical thinking, Watson – Glaser test for measuring the critical thinking is composed of five sub-tests (a detailed description of the test can be found in the section 2.2. Measuring instruments) which measure five different skills of critical thinking.

DISCUSSION

The difference in the development of the critical thinking before and after practising the skills of critical thinking

The purpose of the conducted research was by testing the significance of the hypothesis to answer the question:

Whether the development of the critical thinking depends on practising the critical thinking skills?

The main hypothesis of this research states: ***„ The level of development of critical thinking is higher with subjects exposed to practising critical thinking skills than with subjects not exposed to practising critical thinking skills".***

Within the frames of this hypothesis, our matter of interest were the changes in critical thinking of the subjects of the experimental group which occurred after the intervention of the experimental factor - practice of critical thinking with the techniques applied on the subjects to develop critical thinking, compared with the control group that was not exposed to the experimental factor. The techniques for practising critical thinking which were used as experimental factors were: a diagram of the main issue, *persuasion scale (a visual scaffold)* and table interpretation of the academic language. These techniques are not randomly selected to be used in this research. With the technique diagram of the main issue the skills evaluation, assumption and conclusion are practised; with the technique *persuasion scale (a visual scaffold)*, the argumentation skill is practised, while the technique interpretation of academic language practices the interpretation skill. These skills were measured by the test that was used in this research to measure critical thinking (WGCTA). To establish control of certain factors (such as the natural development of critical thinking and maturation) that during the research can contribute to the development of critical thinking despite the experimental factor, along with the changes in the experimental group the changes in the control group are monitored as well. Subjects who were involved in this research were students from two study groups - Psychology and Pedagogy. To control the other factors (apart from maturation and natural development of critical thinking) such as the information and knowledge they acquire during the lectures of other courses, the manner the lecturers teach (both study groups had different courses) and to offset their effect, the experimental and the control group consisted of students from the two study groups. A detailed description of the method of assembling the groups and the descriptive data for the experimental and control group is included in the methodology of the research (2.1 subjects, Table 1).

The obtained results show that in the period between the two tests the experimental group had significantly higher average achievement in terms of critical thinking in the posttest compared to the control group. If we bear in mind the fact that the conditions in which the experiment was conducted may affect the development of critical thinking, we tried to reduce them and enable changes in the dependent variable to be conditioned only by the experimental factor. Subsequently, on the question what conditions the higher achievements in the experimental group during the retesting of the critical thinking skills, we can respond that this development is conditioned by the intervening experimental factor - practice. This claim derives from the realization that in the control group a development of critical thinking is not noticed.

From the obtained results in this research we can conclude that the development of the critical thinking skills can be influenced. This conclusion will be supported by disclosure of research results, which are made by experts, which also show that this ability can be developed. Many researchers explored the question of whether these ability is innate, meaning whether an individual is born with this ability, or it should be developed. The findings of Glaser's research (according to Kvaščev , 1977), Walsh & Paul (1986), and others, point to the development character of this ability. Glaser, who did a lot of research in this field, argues that critical thinking is not a result of biological maturation. The achieved low scores of the control group in this experiment confirm Glaser's claim of and find support in the same. Glaser's opinion is shared by Debbie Walsh and Richard Paul (Walsh & Paul, 1986) who claim that although thinking is a natural process, critical thinking is not, therefore it should be stimulated. Edward Glaser argues that if critical thinking that leads to high academic achievements does not develop by itself, then the development of this ability should somehow be stimulated. But the question arises: how to stimulate the development of this ability and by which factors is it conditioned?

Many conducted studies about critical thinking suggest that its development can be influenced by the

way you teach and learn specific content. Thus Blair and Goodson (according to Walsh & Paul, 1986) did an experiment in which they examined the development of scientific thinking in the social sciences by applying various learning methods. They concluded that the mere teaching of science did not contribute to the development of scientific thinking, but it should be stimulated by applying certain exercises. In this field research is conducted by Ulmer, Kastrinos, Cousin, Creutz and Gezi (according to Walsh & Paul, 1986) who found that critical thinking develops by training the subjects. In all these studies it was shown that the experimental group to which was applied a learning method that develops critical thinking, achieved greater development of critical thinking in comparison to the control group.

Some scientists interested in the development of critical thinking have raised the question: whether under the influence of an experimental variable (i.e. by practising one skill of critical thinking) the development of all the skills of critical thinking which are measured by a certain test could be affected? Most psychologists believe that under the influence of an experimental factor more skills of critical thinking can develop. Subjects in the Glaser's research, influenced by the experimental factor, solved the test that measured the five skills of critical thinking statistically significant more successful in posttesting compared to pretesting (Watson, & Glaser, 2002). Brembek (according to Colbert, 1995) influenced the development of critical thinking of the subjects by an argumentation course. Under the influence of this course subjects have developed all critical thinking skills that were measured with the test which measures critical thinking. Other authors such as Anderson and Dan (according to Kvaščev , 1969) using more experimental factors influenced the development of critical thinking among their subjects. These authors have developed critical thinking of the subjects including the following experimental factors: 1. selection and organization of the relevant facts; 2. performing accurate conclusions; 3. distinguishing the facts from the general opinion; 4. identifying situations in which conclusions cannot be drawn because of insufficient evidence. In the research of Kvaščev (Kvaščev, 1977) in which subjects were exposed to experimental factor analysis of important relationships and rapports of the teaching material, developed the following skills of critical thinking: 1. skills to extrapolate from the given facts and evaluate the level of their accuracy or inaccuracy; 2. skills to evaluate and interpret facts and realize differences between untested generalizations and possible conclusions that are not subject to any reasonable suspicion; 3. the ability to assess the strength of the arguments in the given statement, while subjects have not developed the skill to identify the unstated assumptions in the respective claims and the deduction skill. According to Kvaščev, under the influence of one experimental factor all the skills of critical thinking cannot develop, since it is a complex phenomenon, which contains more skills. Other authors who claimed that one experimental factor can develop all skills that are measured by the test of critical thinking, did not prove their claims. Although subjects that these authors included in their research showed statistically significant results on the overall test results for critical thinking, they did not list exactly what skills developed in their subjects.

SUMMARY

Empirical research of possibilities to stimulate and develop critical thinking by applying practising techniques: a diagram of the main issue, persuasive seesaw scaffold of argumentation and table interpretation of academic language have been initiated in order to make more extensive research in the field of critical thinking. In Macedonia, such research is done by Open Society Institute, in order to check the possibility of developing critical thinking through reading and writing. The project, which was implemented in Macedonia "Through *reading and writing to critical thinking*" is a joint project of the International Association for reading, Hobart and William Smith Colleges and the University of Northern Iowa, USA, and its implementation involved more countries in Central and Eastern Europe and Central Asia. In our research, the development of critical thinking is stimulated by certain techniques that are applied in learning the course content of general psychology. Another reason why this research was conducted was the fact that in recent years in the world, great importance is given to the development of critical thinking. It is valued as the factor that influences building a better quality of life, more successful problem solving, bringing conclusions on a logical basis and more. Critical thinking is noticed in individual differences in how to approach problems and issues. It is the best way to reach the truth. In a real sense, critical thinking is strong, natural and comprehensive. There is no time and place where there will be no value. As long as people wonder what is true and what is not, as long as they wonder what to believe and what to reject, critical thinking will be necessary. Experts are convinced that critical thinking is a powerful human phenomenon. The ideal critical thinker is characterized not only by their cognitive skills, but also with a specific approach to life in general.

Unfortunately, many of the things that are taught in schools are detrimental to the development of critical thinking. In our society there is lack of students who want to learn the material on their own and make its analysis, make their own conclusions, to be able to properly interpret the texts they read. The students in our schools are more inclined towards mechanical learning. It comes from the fact that teachers themselves with their attitudes affect in stimulating this kind of learning, that is, teachers ask students to remember facts and data, not a stand-alone data processing.

Using the results obtained by testing the hypothesis we can conclude that:

The level of development of critical thinking is higher among subjects exposed to practising critical thinking skills. This conclusion is derived by ANOVA testing of repeated measures and the t - test. The research found that subjects who practiced techniques: a diagram of the main issue, persuasive seesaw scaffold of argumentation and table interpretation of academic language progressed significantly compared to subjects in the control group.

The results of this study can be a solid basis for future researchers on researching causal relations between critical thinking and social status of the subjects, the level of their parents' education, living environment, the type of high school, gender, dispositions to critical thinking and other. Longitudinal research in this field of study can be conducted as well and trained subjects on the development of critical thinking can be followed through their study period.

Bibliography

Абази, N. (2003). *Развивање на критичкото мислење во наставниот процес*. Скопје: Педагошки факултет "Св. Климент Охридски

Ачковска – Лешковска Е. и Миовска – Спасева, С. (2010). *Критичко мислење во универзитетска настава*. АД. Скопје: Скенпоинт

Ачковска – Лешковска Е. и Миовска – Спасева, С. (2000). Реализација на проектот Со читање и пишување до критичко мислење во основното образование во Македонија. Во зборникот: Традиционалното и современото во воспитно образовната теорија и практика, Педагошки факултет Св.Климент Охридски, Скопје, 152-160

Berman, S. (2001). Thinking in context: Teaching for open-mindedness and critical *understending. In the book. A.L. Costa (Eds.).* Developing Minds: A Resource Book for Teaching Thinking *(3rd Edition). Alexandria, Va.: Association for Supervision & Curriculum Deve.*

Beyer, B.K. (2001). Developing a scope and sequence for thinking skills . Во книгата. A.L. Costa (Eds.). Developing Minds: A Resource Book for Teaching Thinking *(3rd Edition). Alexandria, Va.: Association for Supervision & Curriculum Deve.*

Carr, K. S. (1990). *How Can We Teach Critical Thinking?*. ERIC Identifier: ED326304

Case, R. (2005). *Bringing critical thinking to the main stage.* The Critical Thinking Consortium. Education Building. University of British Columbia

Case, R. & Daniels, LeR. (2001). *Preconceptions of critical thinking*. The Critical Thinking Consortium. Educational Building

Chaffee, J. (1985). *Thinking critically*. Boston: Houghton Mifflin Co

Colbert, R.K. (1995). Enhancing critical thinking ability through academic debate. Contemporory argumentation and debate 16, 52-72. Вчитано на 15 октомври, 2011, од веб-страната: www.cedadebat.org

Despotović, M. (1997). *Znanje i kritičko mišljenje u odraslom dobu*. Beograd: Institut za pedagogiju i andragogiju Filozofskog Fakulteta

Elder, L. & Paul, R. (2004). Critical Thinking, Critical Thinking and the Art of Close Reading. *Journal of Developmental Education*. 27. 3.

Elder, L. & Paul R. (1996). *Critical Thinking Development: A Stage Theory.* Loaded on May 15, 2009, From the web page: http://www.criticalthinking.org/

Facione, A. P. & American Philosophical Association. (1990). Critical Thinking: A statement of Expert Consensus for Purposes of Educational Assessment and Instrucion. "The Delphi Raport". The California Academic Press. *ERIC doc. No.: ED 315 423*

Facione, P. A., Facione, N. C. & Giancarlo, C. A. (1996). *The motivation to think in working and learning.* New Directions for Higher Education. 96(Winter)

Facione, N. C. & Facione, P.A. (1996). Externalizing the critical thinking in clinical judgment. *Nursing Outlook*, Volume 44, pages 129-36.

Facione, P.A., Giancarlo C.A., Facione, N.C. & Gainen, J. (1995). The disposition Toward Critical Thinking. *Journal of General Education (*Volume 44, Number (1). 1-25

Facione, A.P. (1992). *Critical Thinking:What It Is and Whay it Counts*, Insight Assessmant, CAP

Facione, A. P. (1990). *The California Critical Thinking Skills Test: College Level Technical Report.* Millbrae CA: The California Academic Press.

Glaser, R. & Resnick, L. 1991. National Research Center on Student Learning. *ERIC/TM Digest* (Eds.). *Life-span development and behavior*. Vol. 5. New York: Academic Press.
Grozdanić, V. (2009). Poučavanje i evaluacija kritičkog mišlenja. *Napredak*. Vol. 150. Br. 3-4
Kvaščev, R. (1977). *Развој критичког мишлења код ученика*. Београд: Завод за издавање уџбеника
Лазареска, С. и Анѓелеска, Н. (уредници).(2004). *Со читање и пишување до критичко мислење*. Скопје: Фондација институт отворено општество *critically.* Scarborough, Ontario: Pippin Press.
Walsh, D. & Paul, R. W. (1986). *The Goal of Critical Thinking: from Educational Ideal to Educational Reality.* Washington D.C.: American Federation of Teachers.
Watson, G & Glaser, E. (2002). *Watson-Glaser critical thinking appraisal – UK Edition*. London: