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ENCOURAGING HIGHER LEVEL QUESTIONING BY THE USE OF TEACHING TECHNOLOGY

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Abstract. Aiming to analyze learners' participation and their readiness to formulate higher level questions under the influence of the teaching technology, a research was conducted in the subject of civic education. Research population sample comprised 126 pupils and the data was collected through a survey conducted amongst the pupils. In order to motivate the pupils to ask higher level questions, the overhead projector, television and the computer were used. Research findings show the tendency of the increase of pupils' motivation for formulating questions that develop higher level thinking and reflection in responding as a result of the use of the teaching technology, but, at the same time, they indicate the low level of their application in the teaching practice. The situation of poor application of questioning strategies which stimulate the development of higher level thinking, as well as the lack of use of the teaching technology has to be changed in order that the teaching process changes and educational needs are successfully realized.

Keywords: higher level thinking, pupils' questions, civic education, teaching technology

Introduction

To generate higher level thinking processes, questions must elicit answers that have not already been presented. The most educationally valuable kinds of questions are those requiring pupils to extend knowledge, deepen understanding or achieve new insights in the process of composing a response (Egan, 1975). Planning the questions in advance of actual learning time helps assure questions go beyond simple recall of information. Higher level thinking skills are grounded in lower order skills such as discriminations, simple application and analysis, and cognitive strategies and are linked to prior knowledge of subject matter content.

The need for building a state on the principles of a democratic society in the post-war Kosovo, influenced the design of the new curricula and syllabi, in which the subject of civic education aims to assist the pupils 'to become aware of their personal identity and safety, to respect beliefs and cultural values in a multiethnic society, to comprehend the rights and responsibilities, and to get acquainted with the nature of the functioning of democracy.'[1)] Since this subject prepares the pupils to act and reason about social

activities, it is realized through discussion; therefore questioning gains the primary role in the teaching process. During the classroom activities lack of clarity and difficulties occur, and either spontaneously or in an organized manner, expressions which contain question words 'why' and 'how' that initiate questions and develop critical thinking, derive. Critical thinking is 'thinking about one's thinking to improve thinking' (Paul & Elder, 2006). Socratic questioning techniques provide opportunities for pupils to use higher-level thinking strategies. When executed well 'these activities give students opportunities to provide their own interpretations and viewpoints and to use critical thinking and problem solving' (Tileston, 2004).

Viewed historically, 'the traditional image of teaching is "telling" – the words of the Master communicated to the learners who learn and remember them' (Jarvis, 2006). Despite the changes in educational theory and technology, it is still observed that teachers mainly pose lower level questions which characterize mechanical reproduction of information and do not consider adequately the 'four basic questioning strategies: convergent, divergent, evaluative and reflective questioning' **(**Orlich et al., 2009). Learners ask few questions since they are not sufficiently motivated by the teachers. In our schools pupils are still hesitant and in the teaching process the barrier in communication between teacher and pupils is still present to a certain extent. Hesitation undeniably hinders the process of questions posed by pupils themselves. Apart from this, questions asked by pupils depend on their practical experience, the level of their development, as well as their interests.

The manner in which the question is formulated is an indicator of the quality and effectiveness of the teaching. Questioning is the active element which should be intensified and used most of the time during the lesson in the subject of civic education. Questions "seek to focus discussion and thinking, and are appropriate for the cognitive range of learners in the classroom" (Godinho & Wilson, 2004). Through it pupils adjust their opinion and behavior positively, form attitudes and values, and achieve to evaluate, make decisions, and act appropriately. The mastery of asking questions is an important part of effective teaching. Dewey, the founder of pragmatist philosophy in education, regarding the skills of using the questioning technique states: "What`s in a question, you ask? - Everything. It is the way of evoking stimulating response or stultifying inquiry. It is in essence the very core of teaching" (Dewey, 1933). Higher order thinking skills in Bloom's Taxonomy (1964) are to be used to better understand a situation, event, or phenomenon. Reflective thinking, according to Dewey, is turning a subject over in one's mind and giving it careful and serious consideration. Pupils can be especially challenged to reflect on the meanings and implications of course content on their own life, experiences, and ways of looking at the world.

In the subject of civic education the questions related to social groups and institutions (family and school), culture (language, communication, and cultural diversity

and similar) are critical elements by which the teacher stimulates pupils' thinking, develops divergent thinking, clarifies thought and seeks response. Lessons in this subject integrate a source of questions to be asked in class. Pupils are involved at the level of using the information obtained earlier and develop thinking in order to give response to questions of critical level. Their thinking is stimulated and thus new abilities and values are created.

Research methodology

Aims and objectives of the research

Contrary to traditional teaching in which posing questions was exclusively the teacher's domain, in contemporary teaching questioning is a reciprocal process which is realized between the teacher and pupil.

The aim of the research was to analyze the motivation of pupils to ask higher level questions under the influence of teaching tools since "in constructivist classrooms, the technology can be used as a powerful tool for exploration and discovery" (Eagleton & Dobler, 2007).

Hence, the objectives of the research that derive from this formulation are as follows: (i) to demonstrate the effects of the teaching technology in stimulating pupils to ask higher level thinking questions; (ii) to promote divergent thinking in acquiring the teaching content; (iii) to draw conclusions and provide recommendations aiming at the increase of the quality of teaching through the use of questioning in classroom.

Research hypotheses

The primary hypothesis that we were lead by was: pupils are encouraged to formulate higher level questions and discuss the knowledge obtained as the effect of the use of the teaching technology in the subject of civic education. The following sub-hypotheses have derived from the primary hypothesis: (1) pupils are encouraged to pose open (divergent) questions; (2) through questions pupils analyze acquired knowledge; (3) questions activate pupil's ability to reason; (4) the use of questioning strategies encourages pupils to draw conclusions in their responses.

Research methods, techniques and instruments

The theoretical core of the problem in our research required description; therefore, the theoretical analytical method and the descriptive method were used. Apart from these, the statistical method was used in processing the data which enabled us to deduce the final results. The techniques that were used in the research was survey, whereas the questionnaire for the pupils was utilized as research instruments. The data collected through the application of the above mentioned techniques was analyzed by the use of

the statistical methodology: arithmetical mean (X), variance (V), standard deviation (SD), average in percentage (%). In investigating the level of correlation between the variables, Pearson's correlation (rxy) was utilized, whereas χ^2 (chi-square) was used in assessing the difference between the observed and the anticipated frequencies.

Research population sample

The research population sample consisted of the pupils of primary schools (grade 5) of Prishtina and Gjakova (urban area) and the pupils of the primary school in the village of Malisheva of the municipality of Gjilan (rural area). The schools that participated in the research are: two classes with the total of 52 pupils in the primary school 'Elena Gjika' (Prishtina); two classes with the total of 52 pupils in the primary school 'Mustafa Bakija' (Gjakova); and one class with the total of 22 pupils in the primary school 'Emin Duraku' (village of Malisheva) were selected.

Research findings and discussion

Questioning in classroom influence learners' achievement, attitudes, and thinking skills. The level of the question tends to evoke a similar level of response. High-level questions are very effective because they encourage pupils to process information in different ways.

The questionnaire that contained ten questions was administered amongst the pupils and the research findings that derive from a number of survey questions are presented in the paragraphs that follow.

Motivation of pupils to pose open questions when teaching is conducted by the use of the overhead projector

The pupils' opinions regarding their desire and motivation to pose open questions are presented on Table 1.

Table 1. Motivation of pupils to pose questions

Do you like making questions when overhead projector used in class?	never	sometimes	often	always	total
Prishtina	3.84%	17.30%	23.07%	55.76%	100%
Gjakova	5.76%	11.53%	25%	57.69%	100%
Village of Malisheva	4.54%	9.09%	22.72%	63.63%	100%
Arithmetical mean	2	5.66	10	24.33	-
Variance	0.66	8.22	12.66	53.55	-
Standard deviation	0.82	2.86	3.55	7.31	-
Average	4.76%	13.49%	23.80%	57.93%	100%
N	6	17	30	63	126

The analysis of the data obtained reveals that the majority of pupils, respectively 57.93% are encouraged to pose open questions when teaching is conducted by the use of the overhead projector. On the other hand, a considerable number of pupils, more precisely 23.80% think that they are 'often' encouraged to ask questions, 13.46% declare that this happens 'sometimes', whereas 4.76% of the respondents opt for the alternative 'never'. According to the research findings, since the value of chi square (χ^2= 10.80*)* is higher than the limits of the degree of freedom, it is ascertained that the responses obtained in this representative group are of statistical significance.

Based on the obtained result, it is ascertained that learning under the circumstances of application of contemporary technique is an important factor in encouraging pupils to generate questions, which is an indispensable element in departing from the traditional verbal teaching. Questions motivate productive thinking rather than memorization by repetition. Students make their ideas available to all in the class, thereby making it 'common' knowledge (Edwards & Mercer, 1987). Questioning is the good part of teaching. However, despite its prevalence and importance, fine-grained analyses uncovering the details of this practice are rare. While several categories of teachers' questions have been proposed by others, they have focused on individual questions. These include Bloom`s taxonomy (1964), open and closed questions (Blosser, 1973), productive questions (Elstgeest, 1985) and questions based on mental operations (Koufetta-Menicou & Scaife, 2000).

Pupils analyze knowledge through questions

Table 2. Questions that encourage analysis of knowledge

How often has the television helped you to analyze knowledge through questions?	**never**	**sometimes**	**often**	**always**	**total**
Prishtina	1.92%	11.53%	26.92%	59.61%	100%
Gjakova	3.84%	7.69%	30.76%	57.69%	100%
Village of Malisheva	4.54%	9.09%	31.88%	54.54%	100%
Arithmetical mean	1.33	4	12.33	24.33	-
Variance	0.22	2.66	14.88	76.22	-
Standard deviation	0.47	1.63	3.85	8.73	-
Average	3.17%	9.52%	29.36%	57.93%	100%
N	4	12	37	73	126

χ= 7.22 rxy = –0.59

From the data presented on Table 2 it results that 57.93% of pupils think that the television 'always' has an impact on generating higher level questions that require

greater intellectual activity and analysis of knowledge**.** The average of the second alternative 'often' is 29.36%, whereas 'sometimes' 9.52% and 'never' 3.17%. According to the research findings, the value of χ^2=7.22 indicates that the difference between the frequencies is significant and can be compared at the level 0.05 with the degree of freedom 12, whereas the correlation coefficient rxy= -0.59 is negative and significant. These results lead to the ascertainment that presentations by the use of the television motivate pupils to ask questions which help them develop higher level thinking. The use of the television in the subject of civic education contributes to the realization of interactive teaching and through discussion and various questions pupils develop their creative abilities and intellectual skills. The more questions are asked by pupils during a lesson, the greater the possibility for higher level questions to occur. The teacher`s intent is to elicit what students think, encourage them to elaborate on their previous answers and ideas and to help students construct conceptual knowledge. When students learn to routinely ask themselves these questions, the depth and quality of their thinking are enhanced (Resnick, 1986).

Questions that activate pupils' ability of reasoning

Table 3. Questions that activate the ability of reasoning

Has the computer stimulated you to reason about the learning contents by asking questions?	**never**	**sometimes**	**often**	**always**	**total**
Elena Gjika	0.53%	17.30%	32.30%	48.84%	100%
Mustafa Bakija 2	0.53%	19.23%	26.53%	52.69%	100%
Emin Duraku	0.54%	3.54%	35%	54.90%	100%
Arithmetical mean	1	6.66	13	22	-
Variance	0	16.22	14	32.66	-
Standard deviation	0	4.02	3.74	5.71	-
Average	0.53%	13.69%	42.26%	52.14%	100%
	3	20	39	64	126

χ^2=7.89 r*xy*= –0.41

The results presented on Table 3 indicate that 52.14% of pupils consider that the computer 'always' influence reasoning about information, 42,26% have responded by 'often', 13.69% 'sometimes, whereas 0.53% have chosen 'never'. From the research findings it is ascertained that x^2= *7.89* and that there is a significant difference between the frequencies at the level 0.5 with the degree of freedom 12. The correlation coefficient rxy= -0.41 is negative and of statistical significance.

Based on these data, considering the contemporary concept of questioning and its aims, it may be stated that questioning serves not only to check knowledge, but also to assist pupils to get nearer to the response which leads towards drawing conclusions and reasoning about the learning contents.

Questions that demand inferential reasoning, much less hypothesis-formation or the creative transfer of information to new situations, simply do not occur with any frequency (Gall, 1984; Mills et al., 1980). In spite of the obvious educational advantages of emphasizing higher-order questions, research studies of classrooms conducted by Hare & Pulliam (1980) confirm that only 20 percent of classroom questions posed by teachers require more than simple factual recall. Goodlad (1983) reports that only about one percent of classroom discussion invited students to give their own opinions and reasoning.

Pupils' questions help in drawing conclusions

Table 4. Pupils' questions help higher level thinking

Do your questions help you in drawing conclusions from the learning content?	never	sometimes	often	always	total
Elena Gjika	3.69%	11.15%	28.84%	56.30%	100%
Mustafa Bakija 2	2.76%	7.30%	36.53%	53.38%	100%
Emin Duraku	4.09%	4.54%	36.36%	55%	100%
Arithmetical mean	1.33	3.66	14	23	-
Variance	0.22	4.22	20	60.66	-
Standard deviation	0.47	2.05	4.54	7.78	-
Average	3.51%	7.66%	33.91%	54.89%	100%
N	4	11	42	69	126

χ^2=9.58 rx*y*= –0.52

The data presented on Table 4 indicate that 54.89% of pupils emphasize that questions 'always' influence the process of drawing conclusions, 33.91% consider that their questions 'often' have an influence on drawing conclusions, 7.66% have responded by 'sometimes', whereas 3.51% have chosen 'never'. In this case the value χ^2= 9.58 indicates the difference of statistical significance between the theoretical and the empirical frequencies, whereas the correlation coefficient rxy= -0.52 is also negative and of statistical significance. Reflecting upon these data it can be ascertained that the success of teaching depends on teacher's ability to stimulate questioning strategies in pupils. If we want our teaching to be concrete and logical and our pupils to be able to draw conclusions by comprehending the core information, then the teacher is required to be the master in posing questions. The ability to manage and orchestrate classroom discourse to support student learning is an important aspect of pedagogical content of knowledge (Shulman, 1986).

High-level-cognitive questions can be defined as questions that require pupils to use higher order thinking or reasoning skills. By using these skills, pupils do not remember only factual knowledge. Instead, they use their knowledge to problem solve, to analyze, and to evaluate. It is popularly believed that this type of question reveals the most about whether or not a student has truly grasped a concept. This is because a student needs to have a deep understanding of the topic in order to answer this type of question. Teachers do not use high-level-cognitive questions with the same amount of frequency as they do with low-level-cognitive questions. Ellis[2)] claims that many teachers do rely on low-level cognitive questions in order to avoid a slow-paced lesson, keep the attention of the students, and maintain control of the classroom.

The use of contemporary teaching technology in the subject of civic education

Table 5. Application of teaching technology in the subject of civic education

To what extent is teaching technology used in the subject of civic education?	**never**	**sometimes**	**often**	**always**	**total**
Elena Gjika	61.53%	17.30%	15.38%	5.76%	100%
Mustafa Bakija 2	57.69%	21.15%	13.46%	7.69%	100%
Emin Duraku	77.27%	9.09%	9.09%	4.54%	100%
Arithmetical mean	26.33	7.33	5.66	2.66	-
Variance	44.22	14.88	6.88	1.55	-
Standard deviation	6.64	3.85	2.62	1.24	-
Average	65.49%	15.84%	12.64%	5.99%	100%
N	79	22	17	8	126

The results presented on Table 5 confirm the absence of the use of teaching technology in the teaching practice. Thus 65.49% of pupils have indicated that the teaching technology is 'never' used in the subject of civic education, 15.84% claim that it is used 'sometimes', 12.64% declare that it is 'often' used and 5.99% mark the alternative 'always'. The results indicate that the existing situation in primary schools is a matter for concern since the awareness for the role and the importance of particular technical innovations is not of the required level. Application of the teaching technology and the transfer of theoretical achievements in pedagogical practice are conditioned by teachers' professional development in schools, on which the increase of quality and effectiveness of teaching depend. It is difficult to imagine an untrained teacher who is not informed about the innovations in teaching, who is trained for the program tasks of traditional school, to be the promoter of technological changes in contemporary school.

Conclusion

Based on the theoretical analysis of the literature in the field of education, as well as on the statistical parameters of the findings obtained in the research conducted in a number of schools in Kosova, the following conclusions can be drawn: (1) Pupils are encouraged to ask questions and increase their active participation in discussion when teaching is conducted by the use of the teaching technology. The majority of pupils (59.52% have indicated 'always') claim that under the influence of the teaching technology they are encouraged to ask productive questions in order to have deep understanding in the subject of civic education. This conclusion confirms the central research hypothesis and, at the same time, empowers the ascertainment that pupils are willing to make higher level questions due to the impact of the teaching technology. (2) The results obtained from the majority of pupils (57.93%), confirm that pupils are encouraged to pose open (divergent) questions by the use of overhead projector. Construction of notions, development of imagination, as well as stimulation of the ability to analyze, compare and evaluate information in the subject of civic education, provide grounds for the development of higher level thinking. These particular findings confirm the first sub-hypothesis. Through the questions that encourage critical thinking pupils gain the ability to make rational evaluation, to have rational thoughts and defend them. This provides pupils the practice in critical thinking. (3) Research findings support the ascertainment that television stimulates questions through which pupils reason and draw conclusions regarding the teaching content (see Table 3 which shows that 52.14% have responded by 'always' and 42.26% 'often'). The data collected from the interviews with the teachers indicate that formulation of questions has a powerful influence on intellectual engagement of pupils as well as on reflecting upon responses. The principal aim of questioning is to stimulate learning and develop higher level thinking. The data confirms the second sub-hypothesis. (4) From the obtained findings it can be concluded that the greater ratio of pupils (54.89%) declare that application of computer helps pupils in drawing conclusions and in generalizing knowledge. The data confirms the third and forth sub-hypothesis, that active questioning enables pupils to deepen their knowledge through thinking, reasoning, and drawing conclusions in responding. (5) The findings obtained regarding the application of the teaching technology in school practice, lead to the conclusion that the teaching tools have not yet been widely accepted in teaching (65.49% of pupils have responded that they are 'never' used). At the time of the implementation of school reforms, the issue of teacher training and their solid preparation for successful use of the teaching technology is an essential requirement.

The conclusions discussed above provide grounds for the following recommendations: (a) In the teaching process motivate pupils' by open questioning and encourage in-class discussion; (b) Motivate the development of higher level thinking through

pupils' questions avoiding memorizing facts and mechanical repetition of information; (c) Create opportunities for pupils to express their opinions freely, to provide new ideas and develop divergent thinking; (d) Use teaching technology and utilize it to encourage the readiness of pupils to pose questions.

The research findings lead to the conclusion that the questioning strategy represents one of the essential factors in changing the teaching and learning in the classroom. The quality of obtaining knowledge in the subject of civic education can be enhanced by the questions that encourage higher level thinking that are posed by pupils. The development and perfection of mental abilities through productive questions in this subject will help each pupil to have a vision for articulating attitudes and to be independent and quick-minded. (S)he will successfully participate in activities and will gain the capability to actively perform and make progress in life in the society in which (s)he lives.

NOTES

1. *The Curriculum for K – 5.* (2005). Prishtinë: Libri shkollor.
2. Ellis, K. (1993, February). Teacher questioning behavior and student learning: what research says to teachers. Paper presented at the Annual Meeting of the Western States Communication Association Albuquerque, NM. (ERIC Document Reproduction Service No. ED359572).

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