

EDUCATIONAL VALUES OF QUESTIONING AND SELF-QUESTIONING

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Abstract – *The ability to ask and answer questions plays a central role in the learning process. This paper presents results from one-semester research done on sample of 103 second-year students at Goce Delcev University, Štip, Faculty of Education. The purpose of the research was to check the students' ability for questioning and self-questioning and its influence on academic achievement. As an indicator of the ability for questioning and self-questioning we used the Bloom's categories of the educational aims in the cognitive area, while as an indicator for academic achievement we used the results of written examination of the students. The analysis of the results shows that the students don't know the educational values of questioning and self-questioning and they are rarely used as strategies for learning. They mainly ask questions which help them develop the ability of memorization and reproduction. Also they can hardly notice the key issues in the materials they learn. The implementation of questioning and self-questioning as strategies for learning and teaching during School pedagogy lectures resulted in improvement of the ability for questioning and self-questioning, as well as improvement of the academic achievement.*

Key words: *teaching strategy, learning strategy, questioning, self-questioning, academic achievement*

Theoretical – Empirical context of the problem

Self – questioning is a strategy for teaching and learning, that aims to assist the process of knowledge acquisition, understanding of concepts and content, problem solving and development of meta – cognitive thinking. Its effectiveness is researched from different theoretical perspectives. The most exploited ones are: active processing, meta-cognitive and schema theories (Wong, 1985).

Those that support the active processing theory think that self – questioning improves content understanding and stimulates student activity. According to this approach, active questioning during reading helps students focus on the content being learned.

King (1989), Nolan (1991) and Ozgungor & Guthrie (2004) suggest that metacognitive theory emphasizes the need for development of awareness for psychical processes and cognitive functioning that enable the student to self – observe understanding. Self – questioning helps the student to become aware of both what he learned or understood and what he didn't learn or understand. E.g. "Which part of the contents is clear/unclear to me? Which part of the contents am I already familiar with?"

At the same time, self -- questioning makes the student capable of discovering the key elements in the learning material. Therefore, the right self-asking questions as a meta-cognitive strategy should be able to help students focus on the important aspects of the material they read. Through a questioning-answering-questioning cycle, students can effectively analyze the content, relate it to their prior knowledge, and finally evaluate it and reassign their cognitive resources accordingly. When students fail to answer the questions they themselves post, they can take remedial action by asking themselves related questions, or asking questions of other information sources (I-Lin Huang, 2006).

The schema theory prefers to state that, during the learning process, the pupils are calling upon their previous experiences and knowledge that are connected with the learning material. New knowledge and experiences are built into those already existing; this is the process of restructuring which in turn leads to a higher level of understanding. According to this theory, understanding of the learning material and solving problems depend on pupils' abilities to activate their previous knowledge.

Table 1. Theoretical basis of questioning and self-questioning

Theoretical perspective	Main assumption	Types or functions of questions
Active processing theory	Active generate questions during reading leads to an understanding of content and training of students for independent thinking.	– Asking more questions leads to more thorough processing – Higher order, "think-type" questions
Meta-cognitive theory	Awareness of their own mental processes during learning leads to understanding, self – surveillance and self – regulation process.	– Self-monitoring questions – Self-testing; predicting test– and/or teacher-questions
Schema theory	Activation of previously acquired relevant knowledge and experience facilitates learning and makes it more efficient.	– Questions that activate students' prior domain-specific knowledge

This prior knowledge is called schemata and reflects the experiences, conceptual understanding, attitudes, values, and skills a reader brings to a text situation. "...readers are in a better position to comprehend what they are reading whenever they use prior knowledge (schemata) to construct meaning" (Vacca, 2002).

What are the benefits of asking and self-questioning?

In the last thirty years researchers are continuously trying to detect effects of self-questioning in the process of learning and to create didactic approaches for training students for self-questioning. A standard work in this field is the review on self-questioning in instructional research by Wong (1985) and Rosenshine & Chapman (1996).

While earlier studies have focused on the introduction of individual strategy for generating questions and are expected to improve understanding and comprehension, subsequent surveys take into account the complexity of the process of reading and introduce multiple reading strategies. These studies suggest combining self-questioning with other strategies such as reread, explanation, visualization, brainstorming, extraction of keywords, associations, mapping, reciprocal teaching. Such entanglement makes it impossible to precisely detect the contribution of self-questioning compared to other strategies. Yet, they confirm the complexity and layered processes of learning and reading.

In Norman's and Andrea's research (2006) the development of abilities and skills for self-questioning is treated as one aspect of reciprocal teaching. **Reciprocal Teaching** is an instructional strategy for teaching that takes place in the form of a dialogue between teachers and students. Usually, **reciprocal teaching includes instructed students for summarizing, question generating, clarifying, and predicting.** They concluded that through the interactions with the instructor and the other students, low verbal ability students were able to increase their listening comprehension abilities, and to maintain those increases over time.

Rosenshine and Chapman (1996), through meta analysis of 17 intervention studies in which students have been taught to generate questions as a means of improving their comprehension, tried to give an answer to the question – Do students who have been taught to generate questions have increased comprehension? They summarized that teaching student the cognitive strategy of generating questions about the material they had read resulted in gains in comprehension, as measured by tests given at the end of the intervention. The traditional skill-based instructional approach and the reciprocal teaching approach yielded similar results. Generating questions is a comprehension-fostering cognitive strategy.

Student self-questioning is also described as a meta-cognitive or comprehension-monitoring activity, because students trained in question generation may also acquire heightened self-awareness of their comprehension adequacy. It is very important that this research show that self-questioning has higher positive influence on the results of tests that contain comprehension questions and summarization questions, and lower effects upon the results of standardized texts (Rosenshine and Meister, 1994; Rosenshine and Chapman, 1996).

Delisi, M. B. (2001) in her study of the impact of training students to use self-questioning and summarizing on their understanding and retention of expository material concluded that training college students generate main-idea questions while reading and that may enhance their retention and comprehension.

Considering the fact that the higher education includes acquisition of competences such as: comprehension, assessment, analyses, problem solving (mainly depending on what has been learnt / studied) its very important to ask ourselves if the students have been previously trained for self-questioning and to what extend their abilities for self-questioning help them to acquire the lessons successfully.

Also, there is a large body of research on self-questioning and its effect on information retention and the effect on formal assessment results. The researches have been done with university students and high school students. The results show that the students who wrote questions while reading a text, perform better at a test aimed at the recall of facts than those who did not do so. But, these students show better results only for the questions they have made themselves, and these mainly involve memorizing of facts. (Martin, 1985; Denner and Rickards, 1987). Thus, another dilemma has been raised – Is it sufficient for the students to be prepared only to create questions and do self-questioning on memory recall or they should be able to generate questions which would initiate higher level of thinking?

To provide students with quality training for self-questioning we should have in mind that self-questioning is more than just asking questions. Students must learn to pay attention to textual clues that they typically pass by. Then, they must use their background knowledge to generate questions and make predictions. This background knowledge will personalize the questions and predictions, but since background knowledge varies with the individual, each reader will wonder about different aspects of the text. Once these have been generated, the student must learn that the answers to all questions may not be found, that predictions may not be accurate. Then, the student must learn to correct his or her thinking.

Methodology

Although there is no dilemma that almost all teachers support the Socrates posture that question making is an important variable which determines the process of studying, yet it supports the fact that particular types of questions (higher-order thinking questions) promote greater cognitive processing of the content. My teaching experience of 26 years (13 years as an elementary school teacher and 13 years as a university teacher) allows me to conclude that the students have been taught a little to generate questions and self-questioning during their formal education. In the past seven years, I have mainly based my teaching practice on the statement: "Every student can be successful" and that's why I have paid a great attention to improve my teaching practice by employing strategies for active learning. However, it was quite disappointing for me when in the academic year 2008/2009 I could document my long range doubt about students' abilities for generating questions. The proofs were unarguable – The students were not able to generate questions, nor were they enabled for self-questioning. 103 students were asked to make short summaries on three topics and accordingly to generate five questions that would cover the point of the topic. Only 8 of them managed to make at least one question which needs analytical thinking and requires connecting cause-result relations. None of them asked a question whose answer could not be found within the content of the material they were studying. All the other questions were just memory questions (Who?; When?; How many?). Example: List the three scientific areas taught by the school pedagogy?

During the same period the students took their first written examinations (stage). The results were not quite satisfactory and that was another motive for me to start an action research with an aim to develop students' ability for questioning and self-questioning and to examine its influence on academic achievement. As an indicator of the students' ability for questioning and self-questioning we used the Bloom's categories on educational aims in the cognitive area, while as an indicator for academic achievements we used the results from the students' written examination.

The questions in both tests were structured according to the same criteria: 7 memory questions (Knowledge); 5 – Comprehension; 3 – Analysis; 2 – Application; 2 – Synthesis; 1 – Evaluation. According to the method / form of generating questions there were 10 closed type questions and 10 open type questions.

The starting point in this research was hypothesis that the training on generating questions will enable students for questioning and self-questioning, and it will make their learning process easier which will finally result in achieving better examination results for the subject School pedagogy.

In accordance with the proposed aim and hypothesis we managed to conduct the research in two phases:

1. Two workshops, each of 150 minutes, aimed at enabling students to generate questions according to Bloom's categories on educational aims in the cognitive area and teaching them how to individually use self-questioning as a learning strategy.

2. Second written examination (stage) and comparison of the results achieved on the second examination with the ones achieved on the first examination.

Organization and research sample

103 regular (full time) students studying the second year at the Faculty of education, University "Goce Delchev" – Stip were examined during the research. They were divided in three groups for practical purpose.

The workshops were held successively during the period of two weeks (the first two weeks of May 2009).

The second written examination took place during the first week of June 2009.

Questioning and self-questioning as strategies of learning and teaching were included in the teaching process of School Pedagogy (lectures and practice) and after the workshops (the third and fourth week of May).

Research design and teaching procedures

The first phase: Organization and realization of workshops

Topic: Questioning and self-questioning as ways for making the process of learning and teaching easier;

The first workshop

Problems: 1. Why questioning and self-questioning are important for the processes of learning and teaching; 2. Bloom's taxonomy on educational aims and its application;

The second workshop

Problems: 1. Generating questions in accordance with Bloom's taxonomy (cognitive area); 2. Self-questioning;

Students' background knowledge: The students were introduced with the Blooms' taxonomy on educational aims.

Social models of work with students: frontal teaching, group work of 5 students, individual work, and tandem work.

Workshop articulation

The realization of the first and the second phase (Activation of students' background knowledge and creation of a contextual framework for the strategy; and Creation of meaning) of the anticipated topic have been achieved during the first workshop, while the third phase (Reflection) is realized during the second workshop.

Phase one: Activation of students' background knowledge and creation of a contextual framework for the strategy through:

- Recalling the background knowledge on the topic; brainstorming of ideas on the topic – Bloom's taxonomy on educational aims and creation of a knowledge organizer – Cluster.
- Emphasizing the advantages of questioning and self-questioning in making the learning process easier (to facilitate the process of understanding and to achieve learning independence).

Phase two: Creating meaning

- Defining strategies of questioning and self-questioning.
- Explaining the process of questioning and self-questioning and giving examples how these strategies can function in practice.
- Possible types of questions (question words, higher level thinking questions, Bloom taxonomy, questions before, during and after reading).
- Presenting the strategy through loud reading of a selected part of the contents for School pedagogy followed by a comment for what exactly activates our thoughts and how it influences our understanding of the content. Students are led to think about different relations with the content, the questions which need explanation, analysis, evaluation, use or prediction. By explaining our ways of thinking during the reading process and generating different questions, we expect students to get a clear image for the activation of the cognition of the reader and his connection to the text.
- Leading students through the process of strategy use by continuing with reading of a selected part of the content, but this time students (in pairs) get a task to go through the process we have previously explained. First, students write questions and then have oral presentation after which there is a discussion with the whole group.
- Practice the strategy – Students work independently within the whole-group setting under the teacher monitoring. We either continue reading segments of the text with reduced teacher support or invite the students to read independent-level text on their own. In both cases the students independently use the strategy to generate and respond to question-answer relationships. During this stage, we differentiate our support by providing scaffolding for those students who need more

support, and by releasing the task to those students who are ready to use it. The goal is to ensure that students know the strategy and the process for using it.

Phase three: Reflection

- Encourage students to reflect on how using the strategy helped them to understand the text. (Full involvement and support by the teacher)
- Invite students to share their reflections in groups or with the whole class. (Teacher's involvement only when needed)
- Discuss how they can use the strategy when they are reading on their own. (Reduced involvement and support by the teacher)
- We also use multiple authentic assessments like observation, discussion, notes.

Results from the conducted workshop

Because the theme of the workshop and its aim were previously introduced to the students and the possible acquisitions were clearly stated, (easing the process of learning and improving the academic success), students' dedication was almost 100%, against 82% of the average dedication on the lectures and seminars for School pedagogy in that term.

What we have concluded about students' pre-knowledge about the theme?

Students know the three domains of the Bloom taxonomy (cognitive: mental skills/knowledge, affective: growth in feelings or emotional areas/attitude and psychomotor: manual or physical skills). Despite that, they don't have idea how they can implement it in the education. They don't know that Bloom's Taxonomy can provide an excellent structure for planning, designing, assessing and evaluating training and learning effectiveness. The model also serves as a sort of checklist, by which you can ensure that teaching is planned to deliver all the necessary development for students, and a template by which you can assess the validity and coverage of any existing training.

Training effects of generating questions and self-questioning

Students' training resulted in positive effects on three levels: affective, cognitive and meta-cognitive.

Affective level: The aims we assigned were supposed to be achieved in short time. Students very soon became very successful in overcoming the technique for questioning and self-questioning. Because of that their studying motivation obviously increased. Even during the first workshop, about 95% of the students participated in initiating questions. In all three groups about 180 questions were generated from which 145 were written.

Cognitive and meta-cognitive level: Students got the point of the questions which demanded different level of thinking. They became conscious about the meaning of questioning and self questioning in the learning process and understanding of the content. They also started to self-observe their own learning progress. Besides questions which start with question words such as: who, when, where and how, there were generated questions such as: Why?, What it means?, What are the components?, What are the similarities and differences?, What are the positive sides?, What is the relation?, What's the meaning of the practice?, What can I conclude?, What's not clear?, Can I use my previous knowledge?, What are the key words?.

Although most of the questions had to be written, students were loudly asking for help and support from both their teacher and their colleagues: Do you agree that in this part it is very important? What are the facts that confirm the author's thesis? Do you agree with the opinion/attitude? What do I know about...? How can this information help me in practicing my future profession?

The influence of the students' abilities for questioning and self questioning over students' academic success (results and discussion)

Before comparatively presenting the results, we point out that in the two weeks that followed, during lectures and seminars, questioning and self questioning were used as teaching strategies, and students had an obligation to generate five questions for each lesson, structured according to Bloom taxonomy.

According to purpose of research and the intention to follow the individual student's progress in Table 2. are presented their individual achievements on the first and second written examination.

Table 2. Comparative presentation of the individual results from the first and the second written examination of students' knowledge in School pedagogy

Group 1			Group 2			Group 3		
No.	I ex.	II ex.	No.	I ex.	II ex.	No.	I ex.	II ex.
1.	12.5	16.5	36.	5.0	12.0	70.	13.0	16.0
2.	17.0	18.5	37.	5.0	13.0	71.	13.5	14.5
3.	11.0	11.7	38.	8.0	16.0	72.	13.0	12.0
4.	13.5	14.0	39.	13.0	14.5	73.	6.0	8.0
5.	11.5	16.2	40.	7.5	15.0	74.	5.0	10.0
6.	7.0	12.0	41.	9.5	17.0	75.	10.0	10.0
7.	12.0	15.0	42.	9.5	13.0	76.	14.0	15.0

First group / class			Second group / class			Third group / class		
8.	6.0	11.7	43.	8.5	12.3	77.	15.0	1300
9.	10.0	14.0	44.	13.0	14.0	78.	12.5	18.0
10.	10.0	12.5	45.	8.0	13.0	79.	11.0	16.5
11.	9.0	15.5	46.	9.0	14.0	80.	9.0	14.0
12.	11.0	16.0	47.	9.5	11.0	81.	11.0	10.0
13.	7.0	13.0	48.	4.0	10.0	82.	11.0	10.0
14.	2.5	11.0	49.	7.5	13.5	83.	14.0	11.0
15.	14.5	9.0	50.	11.0	13.0	84.	10.0	12.0
16.	10.0	17.0	51.	6.0	13.0	85.	7.0	6.5
17.	6.0	15.0	52.	4.0	10.0	86.	13.0	11.5
18.	13.0	18.0	53.	10.0	15.0	87.	5.5	6.0
19.	15.5	16.0	54.	14.5	17.0	88.	5.5	7.0
20.	10.0	18.5	55.	6.0	15.0	89.	14.5	12.0
21.	4.5	16.0	56.	3.0	9.0	90.	4.0	12.0
22.	8.0	15.0	57.	7.0	11.0	91.	11.0	12.0
23.	3.5	11.0	58.	7.0	10.0	92.	14.5	12.5
24.	11.0	17.0	59.	10.0	13.0	93.	12.0	11.0
25.	10.5	16.5	60.	12.5	12.0	94.	3.0	8.5
26.	5.0	14.0	61.	9.5	12.0	95.	7.0	9.0
27.	3.0	11.0	62.	4.0	6.5	96.	9.5	12.0
28.	11.5	19.0	63.	5.0	8.0	97.	12.0	13.0
29.	13.5	19.0	64.	10.5	17.0	98.	15.0	13.0
30.	14.5	19.0	65.	13.5	11.0	99.	8.0	7.0
31.	12.5	18.0	66.	7.0	6.5	100.	5.0	9.0
32.	10.0	19	67.	6.0	13.0	101.	6.0	11.0
33.	11.0	17	67.	5.0	12.0	102.	4.0	11.0
34.	11.0	18	69.	9.5	12.0	103.	8.50	14.0
35.	10.0	15						

According to the evident improvement of the students' success shown in the second examination (second phase knowledge examination) and my long time experience as a teacher I thought that no further statistical data is needed for reaching conclusions. From the chart presentation can be seen that 7 out of 103 students got less points on the second examination compared to the first one.

What is more important for us is students' progress in answering questions of higher thinking level. Summed results from the first and the second written examination divided according to the type of questions are shown in the Table 3.

Table 3.

501	69.45	220	30.55	431	59.78	290	40.22	721	100
103	20.00	412	80.00	364	70.68	151	29.32	515	100
79	25.57	230	74.43	152	49.19	157	50.81	309	100
35	17.00	171	83.00	129	62.62	77	37.38	206	100
23	11.17	183	88.83	101	49.03	105	50.97	206	100
12	11.65	91	88.35	62	60.20	41	39.80	103	100
753	36.55	1307	63.45	1239	60.15	821	39.85	2060	100

The results clearly show that students demonstrated significantly better success after completing the training for questioning and self-questioning. If we compare the number of correct answers from the first and the second check, we will notice that the number of correct answers increased five times for questions that require Synthesis (23/101) and Evaluation (12/62). The number of correct answers for questions requiring Application (35/129) increased about four times, and the number of correct answers to the questions aiming at checking understanding of the material intended for checking increased more than three times. The number of correct answers to analytical questions during the second written check is approximately two times bigger compared to the number of correct answers to this type of questions from the first check (79/152).

Having in mind that questions at these levels were asked in such a manner that, during answering, students were supposed to use the knowledge and experience acquired from other pedagogical and psychological disciplines also, it can be said that the students' ability for questioning and self-questioning facilitates the learning process, improves understanding of the material being studied, enables personal connecting with the text, and helps build one's own concepts of knowledge. Finally, these effects are also reflected upon the success of written testing.

Surprising for us is the discovery of the fact that students showed lower results in the course of the second written testing for questions of the type – Knowledge (501/431). This exception, according to students' statements during the analysis of the achieved results of the second written test, are due to the fact that the questions of the type – Knowledge required knowledge of facts not essential for understanding of the learning material.

Conclusion

Reading comprehension is very important for the success of students in higher education. Although there are numerous methodical-didactic approaches and strategies that help understanding and develop students' critical thinking and thus facilitate the learning process, we cannot overlook the fact that they are very rarely used in higher education teaching.

Unfortunately, as Anderson and Simon have lamented, the "science of human learning has never had a large influence on the practice of education". (William et al., 2006)

Our experience of introducing questioning and self-questioning as learning and teaching strategies indicate that:

- Introducing questioning and self-questioning as learning and teaching strategies should be understood and implemented as a process.
- Strategies are successfully learned when students are trained in the context in which those strategies will be applied.
- Strategy instruction is effective when instructors model effective strategy use for students, especially when this modelling takes the form of thinking aloud.
- Students learn and practice strategies when they know why they are important and useful to them.

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EDUKACIJSKE VRIJEDNOSTI POSTAVLJANJA PITANJA I SAMOPROPITIVANJA

Sonja J. Petrovska

Sažetak – Sposobnost postavljanja pitanja i odgovaranja na pitanja ima središnju ulogu u procesu učenja. U ovom su radu predstavljeni rezultati jednosemestralnog istraživanja provedenog na uzorku od 103 studenata treće godine Pedagoškog fakulteta Sveučilišta Goce Delceva, Štip. Svrha istraživanja bila je provjeriti sposobnost studenata za postavljanje pitanja i samopropitivanje te utjecaj ove sposobnosti na akademski uspjeh. Kao pokazatelj sposobnosti postavljanja pitanja i samopropitivanja upotrijebili smo Bloomove kategorije edukacijskih ciljeva u kognitivnom području, dok smo kao pokazatelj akademskog uspjeha upotrijebili rezultate koje su studenti postigli na pismenim ispitima. Analiza rezultata pokazala je da studenti ne poznaju edukacijske vrijednosti postavljanja pitanja i samopropitivanja te ih rijetko koriste kao strategije učenja. Oni uglavnom postavljaju pitanja koja im pomažu razviti sposobnost memorizacije i reprodukcije. Uz to, studenti slabo zamjećuju ključne probleme u materijalima koje uče. Uvođenje postavljanja pitanja i samopropitivanja kao strategija za učenje i podučavanje tijekom predavanja iz kolegija Školska pedagogija rezultiralo je unaprjeđenjem sposobnosti postavljanja pitanja i samopropitivanja, kao i poboljšanjem akademskog uspjeha.

Ključne riječi: strategija podučavanja, strategija učenja, postavljanje pitanja, samopropitivanje, akademski uspjeh