COMPARATIVE ASSESSMENT AND SELF-ASSESSMENT OF STUDENTS` ENVIRONMENTAL KNOWLEDGE IN BULGARIA AND TURKEY*

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Abstract. The article presents a diagnostic investigation of classroom self-assessment of 174 students in 8th grade of elementary school (92 from Bulgaria and 82 from Turkey). A method of assessment and self-assessment on 40 environmental terms was used. The skill of students to make right decisions about their environmental knowledge was studied. The influence of the differential effect of gender, social status and academic achievement level upon self-assessment was revealed. Comparative analysis of the results from Bulgaria and Turkey showed that most of the students did not reflect critically upon their knowledge and did not evaluate it against school achievement standards. Conclusions were directed to the development of a strategy for classroom as-

sessment involving students consciously in self-assessment and using peer and teachers` assessment for learning, but not merely of learning.

Keywords: assessment, self-assessment, academic achievement, gender, social status, evaluation, self-evaluation, 8th grade students, Bulgaria, Turkey

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Introduction

Self-assessment, self-evaluation and self-esteem are very closely and hierarchically interconnected and very often used interchangeably.[1)] Self-assessment[1)] "is the process of critically reviewing the quality of ones own performance and provision" (Gardner, 2006).

Self-evaluation is a process of diagnosing strengths and weaknesses of oneself and actions being taken to improve them in the pursuit of excellence. It is evaluation of overall quality and improvement, followed by assigning grades. Student self-evaluation is both a process and a product, a form of narrative writing in which students describe their learning in a particular course of study and make qualitative judgments about it.[2)] It is a structured process of review, which compares what actually happened against what was intended to happen.

Self-esteem reflects one`s overall evaluation or appraisal of one`s own worth"[3)], "a pride in oneself, self-respect"[4)], "a confidence and satisfaction a person has in him/herself "[5)], "due respect for oneself, one's character, and one's conduct"[6)]. Academic competence is one of the seventh domains, from which a person derives self-esteem (Crocker & Wolfe, 2001; Crocker & Knight, 2005). Thus self-assessment is the first step in self-reflection of learning achievements (Kitsantas et al., 2004), self-evaluation – the second and self-esteem – the result of both. All of the three depend a lot on assessment and evaluation, carried out by the teacher (internal evaluation) or by other institutions (external evaluation).[7)]

The development of skills in the area of assessment is at the heart of a successful teaching and learning process.[8,9] Effective informal classroom assessment with constructive feedback to the student is bound to promote learning and raise levels of attainment (Black & William, 1998). Learners can acquire ownership of their learning when they understand the goals they are aiming for and the mechanism of the assessment process (Black, 1998; Black & William, 2006). They need skills and appreciation of objective self-assessment and self-evaluation in order to monitor their own academic and personal development (Harrison & Harlen, 2006).

School practice concerned with assessment of learning is well established but assessment for learning is underestimated and often overlooked. For this reason some students and their parents are not satisfied with the results of evaluation and the ascertained levels of achievement. Because of that the Assessment Reform Group[9] pays more emphasis on assessment for learning and works for the development and evaluation of the British National Assessment Program. Physiological bases of learning also stress the necessity of practice in memory and skill development (Krupa et al., 1993; Moser et al., 1994; Thompson, 1986).

Assessment is a systematic gathering of information (and acting upon that information) for purposes of improving the learning and the teaching in educational settings. Its aspects are studied by many researchers: meaning[9] (Raychaudhuri, 1998), principles,[9] external (Gibbons & Chevalier, 2008), internal,[10,11] formative (Sutton, 1995), difficulties and shortcomings (Ogan-Bekiroglu, 2009), importance for raising standards (Black & William, 1998; Atkin et al., 2001; Black & Bromley, 2008), interrelations with teaching and research (Torrance & Pryor, 1998), importance for formative and summative purposes (Harlen, 2006), dependence on professional learning (Gipps et al., 2000, James & Pedder, 2006), requirements for efficacy (Black & William, 1998), participation of students in the assessment process (Sutton, 1995), learner-centered (Crick et al., 2007), performance in the classroom (Torrance

& Pryor, 1998), role in motivation (Zimmerman et al., 1992), comparison of peer- and self-assessment (Cheng & Warren, 2000) self-assessment as a tool for personal learning and achieving academic excellence (Zimmerman, 2002), student cooperation in learning and performance (Gardner, 2002), teaching to and assessing with performance tasks result in understanding as a valuable contribution to assessment (Lewin & Shoemaker, 1998), development of practical materials for teachers[12)] and also Gipps et al., (2000). Research is also directed to peer assessment that can be "usefully and meaningfully employed to factor individual contributions into the grades awarded to students engaged in collaborative group work" (Cheng & Warren, 2000) and to the use of self-, peer and co-assessment (Dochy et al., 1995).

The review of literature suggests that the use of a combination of different new assessment forms encourages students to become more responsible and reflective. Comparisons of the results of teacher and self-evaluation combined with critical and constructive discussion can help students to develop understanding and skills for self-regulated learning in pursuit for excellence.

Method

Participants in the investigation were 174 8th grade students in four groups: two groups (T1 – 36 students and T2 – 46 students) from two Turkish schools in Bursa and two groups (B1 – 40 students and B2 – 52 students) from two Bulgarian schools in Sofia. T1 represented students with low social status, while T2 represented students of higher social status, studying in private elite school. The two Bulgarian groups were also different: students in group B1 had no specialized interest in biology while those in group B2 had a special interest in biology and had passed an entrance biology exam, choosing this area for future professional orientation. Our aim was to compare samples T1 and T2 with respect to the social status of the students and B1 and B2 regarding the students' interest in biology. And although the two groups from Turkey

and Bulgaria were not identical they included students of the same age who studied subjects with comparable contents.

Data collecting was done using self-assessment sheet written in child friendly language to aid children` understanding (William, 2008; Egelund, 2008; Maxwell & Delaney, 2003)). The sheet contained 40 terms, chosen after careful analysis of the textbooks for sixth, seventh and eighth grades in Bulgaria and Turkey. The method had already been used and validated in a number of previous studies (Georgieva, 1995; Kostova & Georgieva, 1997).

The validity of our survey instrument was 0.86, and the reliability was 0.77. The instrument was created in Bulgarian and adequately translated into Turkish language by E. Atasoy, a Bulgarian/Turkish bilingual.

The self-assessment sheet contained instruction and three tasks, formulated as follows: (1) put a mark “K” (know), “H” (heard of) or “NH” (never heard of) for each concept, which best describes your opinion; (2) choose 5 concepts that you know best and explain them; (3) grade your knowledge and understanding (tick one) or use more precise mark from 1 to 5:

□ excellent	□ very good	□ good	□ poor	□ very poor

The self-assessment sheet was administered to the students for one school period of 45 minutes. The dependant variable of this study was the precision of self-assessment, i.e. the degree of approximation of students` self-assessment to the teachers` assessment and evaluation and the influence of social status, interest to biology and gender upon the precision of self-evaluation. The work sheets were collected and analyzed, using evaluation criteria, agreed upon prior to the test. Students were acquainted with the criteria for self-assessment. Statistical analysis was applied to the results.

Results and interpretations

The results were compared using statistical values (Table 1). The mean (X), mode (Mo) and median (Me) are different ways of finding the central value of the data in order to compare them. The results (Table 1, Fig 1) show that in all experimental groups with the exception of B2 group, in which the students had past an entrance exam in biology, the difference between evaluation and self-evaluation is significant. That means that preparation for and success at the entrance exam had been useful for development of understanding and skills for critical and precise self-assessment and self-evaluation (Crocker & Park, 2004). Academic self-esteem of these students was in correspondence with their achievement goals and learning standards. Students had special interests in biology and in the process of studying they competed between themselves, each trying to acquire higher professional knowledge and better marks. The rate of progress of individuals in B2 was high. Biological education in this school is set on higher standards, which are nearer to the entrance exams for the universities, than the standards for the ordinary secondary schools. The results are reflection of pupils` attainment. Students had a real interest in their qualification as it opened doors for them to the next stage of their learning (Raychaudhuri, 1998). Self-evaluation in this case was an empowering process developing skills and reflective learning.

Table 1. Comparative statistical analysis of evaluation and self-evaluation of the variables

Variables	X	Mo	Me	S2	S	V	Sx	t
B1 Evaluation	3.38	3.4	3.4	0.55	0.74	0. 22	0.12	4.82/
B1 Self-evaluation	4.14	4	4	0.44	0.66	0. 16	0.10	1.98*
B2 Evaluation	3.89	4	4	0.42	0.65	0. 17	0.09	1.22/
B2 Self-evaluation	4.05	4	4	0.48	0.69	0. 17	0.10	1.98*
T1 Evaluation	2.55	3	2.6	0.37	0.61	0. 24	0.10	8.26/
T1 Self-	3.72	4	4	0.37	0.61	0. 17	0.10	1.98*

evaluation								
T2 Evaluation	2.82	2.6	2.6	0.48	0.69	0. 24	0.11	4.51/ 1.98*
T2 Self-evaluation	3.48	4	4	0.52	0.72	0. 21	0.12	

- $p < 0.05$

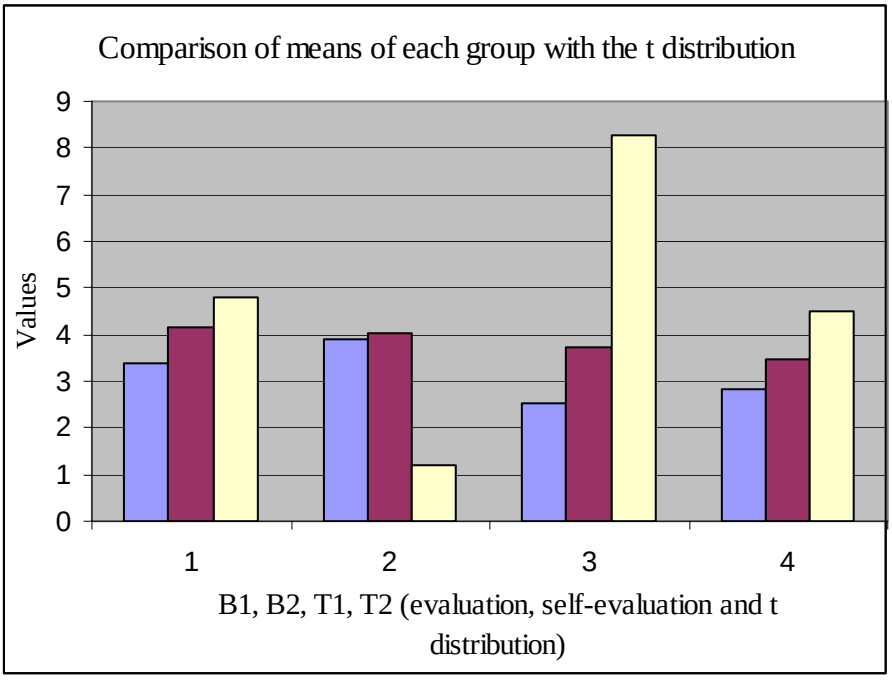

Fig 1. Comparison of means and t distribution

Variance (S^2) and standard deviation (S) are measures of variability. Standard deviation is the most commonly used measure of spread. In B1 variance and standard deviation for evaluation are higher than for self-evaluation, which shows that evaluation marks are more variable. This can be explained with the higher precision of teachers and the use of pre-developed criteria. Students relied predominantly on their intuition and self-esteem. In the other three groups the SD (S) for the distribution of the evaluation marks is either smaller or equal to SD of the self-evaluation marks, which shows that they are clustered more closely to the mean. The coefficient of variation (V) is a measure of dispersion of a probability distribution. Except in B2 group in the other

groups V is higher for evaluation than for self evaluation, which confirms the explanation about the higher precision of teacher evaluation. Sx (SEM), the standard error of the mean, provides simple measure of uncertainty in a value and quantifies the accuracy of the true mean of the evaluation and self-evaluation marks.

Student t distribution for the comparison of the results from evaluation and self-evaluation in B2 is less than 1.98 (Fig 2), which is the standard value at $p < 0.05$ and $f = 52 + 52 - 2$. But in all other groups it is higher and proves that the difference between evaluation and self-evaluation is significant.

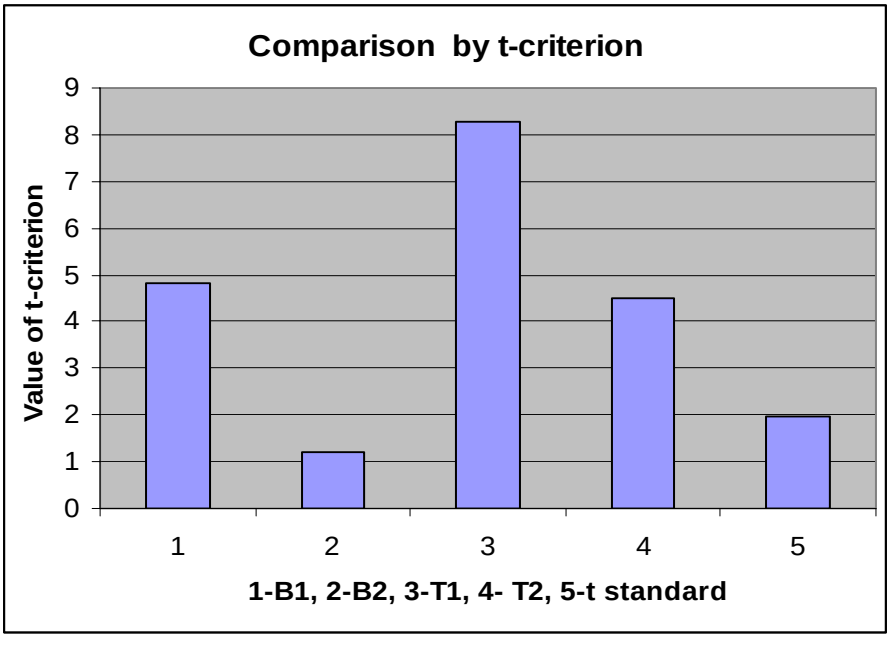

Fig 2. Comparison of evaluation and self-evaluation of each group using Student` t distribution

Social status of student had an indirect effect on self-assessment and self-evaluation. Having better financial resources, students in T2 group were able to afford better education than students in T1 group. But their higher attainments were also the result of greater efforts in studying and more critical

approach to self-evaluation. Academically successful students (B2 and T2) showed a more critical view of themselves and students with more modest academic abilities (B1 and T1) compensated for their academic under achievements by elevating their general self-esteem and using self-protective enhancement (Pullmann & Allik, 2008).

Gender was essential characteristic in assessing students. Males and females (B1), having no special interests in biology (Table 2) showed a tendency to overestimation to a greater degree than males and females from B2, that possessed more responsibility to self-learning and self-development.

Table 2. Comparison of evaluation and self-evaluation in males (m) and females (f)

Treatment & values	Groups	B1		B2		T1		T2	
	Gender	m	f	m	f	m	f	m	f
Evaluation	mean	3.34	3.43	4.21	3.71	2.47	2.63	2.76	2.88
	S^2	0.54	0.57	0.25	0.43	0.31	0.43	0.65	0.34
	S	0.73	0.75	0.50	0.66	0.56	0.65	0.81	0.58
Self-evaluation	Mean	4.14	4.12	4.33	4.02	3.70	3.73	3.64	3.33
	S^2	0.63	0.25	0.53	0.4	0.47	0.31	0.52	0.49
	S	0.79	0.50	0.73	0.63	0.68	0.56	0.72	0.70

The difference between evaluation and self-evaluation does not show a firm tendency between males and females. In B1 (Table 3) this difference was greater for males than for females, but in B2 it was the opposite. That does not tell whether boys or girls were prone to subjective evaluation. Probably this was a personal, but not a gender characteristic. But both boys and girls in B1 overestimated their achievements. School climate and evaluation proved to be important conditions for self-esteem (Hoge et al., 1990). Inflated self-evaluation stimulated inflated self-esteem and low self-responsibilities in studying.

Table 3. Significance of the difference between evaluation and self-evaluation in male (m) and females (f)

Criterion for comparison		Evaluation vs. self-evaluation			
		B1	B2	T1	T2
t distribution	m vs. m	3.64/ 2.00*	0.57/ 2.02*	5.77/ 2.02*	3.84/ 2.00*
	f vs. f	3.03/ 2.02*	1.94/ 1.98*	5.65/ 2.02*	2.84/ 2.00*

*Standard t distribution at $f = n_1 + n_2 - 2$ and $\alpha = 0.05$, n – number of students

Males and females had an inclination to overestimation in all groups, though the difference between male and female evaluation in B2 was greater and more significant (Table 4). The results show that males had higher academic achievements than females. In T1 and T2 groups the differences between males' versus females' evaluation and self-evaluation are insignificant.

Table 4. Comparison of evaluation and self-evaluation of males (m) versus females (f) using t distribution

	B1	B2	T1	T2
m vs. f evaluation (t)	0.37/ 2.02*	2.88/ 2.00*	0.78/ 2.02*	0.58/ 2.00*
m vs. f self-evaluation (t)	0.09/ 2.02*	1.61/ 2.00*	0.14/ 2.02*	1.45/ 2.00*

The two groups (B1 and B2) showed differences in evaluation of males, which meant that males from B2 group had greater academic achievements than males from B1. In respect to self-evaluation the differences were insignificant and showed lack of responsibility and precision in both males and females (Table 5). Academic self-esteem is a predictor of school achievements (Pullmann & Allik, 2008). We assume that inflated opinion of self was built on shaky grounds and could trigger off violence or distress when that opinion comes under threat. It actually decreased grades (B1, T1). Higher aca-

demic performance in B2 and T2 could lead to higher self-esteem and to motivation by success of students (Greenberg, 2008; Maslow, 1987).

Table 5. Comparison of male sand females in B1 and B2 groups using t distribution

Treatment	Males		Females	
	evaluation	self-evaluation	evaluation	self-evaluation
B1/B2	t = 2.87/2.00*	t = 0.79/ 2.00*	t = 1.33/ 2.00*	t = 0.55/ 2.00*
T1/T2	t = 1.26/ 2.02*	0.26/ 2.02*	t = 1.34/ 2.00*	t = 2.03/ 2.00*

Subjective self-evaluation in all groups was higher than objective self-evaluation and overestimation predominated underestimation (Tables 6 and 7). Overestimation stimulated inflated self-esteem, but underestimation shook their self-confidence. Both were detrimental to students. That confirms the necessity for the development of skills and understanding for objective self-evaluation. In B2 overestimation and underestimation were balanced to a certain extend (Table 6), which gave the wrong impression that self-evaluation equaled evaluation (Table 1).

Table 6. Number of boys and girls showing objective and subjective self-evaluation

Variables	Objective evaluation			Subjective evaluation								
				Overestimation			Underestimation			Total		
	B	G	T	B	G	T	B	G	T	B	G	T
B1	10	5	15	12	9	21	2	2	4	14	11	25
B2	9	14	23	6	11	17	4	8	12	10	19	29
T1	1	1	2	16	17	33	0	1	1	16	18	34
T2	2	1	3	18	15	33	2	8	10	20	23	43
B – boys, G – girls, T – total ; B1 Bulgaria: boys – 24; girls – 16; participants – 40 B2 Bulgaria: boys – 20; girls – 32; participants – 52 T1 Turkey: boys – 17; girls – 19; participants – 36 T2 Turkey: boys – 22; girls – 24; participants – 46												

Nevertheless objective evaluation in B2 and T2 was higher (table 7) which could be due to school climate favoring learning, academic achievement and self-responsibility for success. It is proved by the values of S, V and SEM (Table 1). Overestimation and underestimation by one point predominated. Self-regulation and expert performance in B2 and T2 was higher due to reflection and deliberate practice (Gardner, 2002; Zimmerman et al., 1992). Self-monitoring required more time and effort (Zimmerman, 2002), but the students in B1 and T1 were not taught to give it.

The differences between males and females in respect to their self-evaluation are interesting and difficult to explain for both countries. The percentage of boys having objective self-evaluation was higher than that of girls (Table 7) for all groups, except T1, where it was equal. In Bulgaria the percentage of girls overestimating themselves was higher than that of the boys. In Turkey it was the opposite – the percentage of boys overestimating themselves was higher. In B1 group more girls underestimated themselves but in B2 group more boys underestimated themselves. In T1 and T2 the percentage of girls underestimating themselves was higher than that of boys. Females seemed to be less confident in their achievements than males.

Table 7. Percentage of boys and girls objective and subjective self-evaluation

Groups	Objective evaluation			Subjective evaluation								
				Overestimation			Underestimation			Total		
Gender	B	G	T	B	G	T	B	G	T	B	G	T
B1	41.67	31.25	**37.5**	50	56.25	84	8.33	12.5	7.5	35	27.5	**62.5**
B2	45	43.75	**44.23**	30	34.37	58.62	20	6.25	34.48	34.48	65.57	**55.77**
T1	2.77	2.77	**5.55**	94.11	89.47	97.05	0	5.26	2.94	47.05	52.94	**94.45**
T2	4.34	2.17	**6.53**	81.8	62.5	76.74	9.09	33.33	23.25	46.51	53.48	**93.47**
B – boys, G – girls, T – total												

Conclusions

The social status and the entrance exams to school are both very essential in developing skills for correct and critical self-evaluation. Obviously school environment and school practices favored self-evaluation for learning, not only of learning. Students in B2 and T2 had better understanding of their attainment goals, which helped them in self-evaluation. Males showed greater confidence in their academic achievements than females. Females were more inclined both to overestimation and underestimation. Girls in Bulgaria showed greater confidence in their knowledge and self-assessment than girls in Turkey. It was the opposite for boys. It is difficult to say whether the difference between males and females in respect to underestimation was due to lack of self-confidence or to excess of self-exactingness.

Self-evaluation was not regarded as a process where both teachers and student analyze their work and acquire self-assessment as a result. Self-evaluation skills are the condition and result of education, the condition of self-regulated life-long education as they develop personality and regulate behavior (Chen, 2002). The use of self-evaluation techniques allows teachers

and students to reflect on practice and improve effectiveness (Hansen, 1998). Effective self-evaluation provides a great sense of ownership of the evaluation process and should experience a greater consideration in school practice (Black et al, 2002).

Students need understanding and practice in self-assessment and self-evaluation in order to develop their objectivity and self-regulated learning and to acquire proper self-esteem skills and attitudes. Self-assessment should be incorporated systematically into teaching strategies and practices at all levels and only in this way it can provide informed feedback to pupils, develop and sustain skills for objective self-evaluation, i.e. corresponding to teachers` and external assessment and to school and personal goals. The purpose of assessment is to improve standards, not merely to measure them and that should be the case for all schools not only for special schools.

Assessment and self-assessment for learning should be the leading strategy in teaching in order to help students understand their achievements and shortcomings and to give them guiding principles to build on them their successful learning. Peer and co-assessment have not found yet their ways to school practice in the assessed schools, but they can help students understand their responsibility for their own achievements. That of course needs competent teachers and specific experiences as well as school climate and evaluation tools. Objective evaluation and self-evaluation are needed to prepare students for competition in Europe and should make their ways to school planned practices.

NOTES

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