BASIC LEVEL OF ENVIRONMENTAL KNOWLEDGE AMONG HIGHER EDUCATION STUDENTS

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Abstract
Moving towards a sustainable World requires many efforts in various fields including technological development, financing, management and even education. People as consumers and employees are both the beneficiaries and the responsible for the sustainable development. Especially young people play an important role since they are expected to become the corporate decision makers. Improving corporate environmental performance contributes significantly to sustainable development. Accordingly, the level of environmental knowledge is a fundamental influencing factor. The paper summarizes the results of a survey about basic knowledge related to environmental issues. The analysis explores the characteristics of Hungarian higher education business students (n=104). The results show a lack of the average knowledge level based on the learning material of the elementary school.

Introduction

There was an enhancing interest in solving the global environmental and social problems over the past decades. However, the break-through fails due to the conflict of interests, especially economic ones [1]. Notwithstanding that involving economic aspect can explain both personal and corporate behavior, other viewpoints should not be ignored.
The United Nations set up a comprehensive framework model of sustainable development goals. It covers environmental, social and economic aspects (Figure 1). The varied scope of the goals seems to be wordy and diffuse but it denotes the aspects to consider in the related decisions.

Figure 1. Sustainable development goals [2]

Even if economic interest and financial possibilities do not inhibit the sustainable actions, the lack of knowledge may have a negative impact. I believe that professional and environmental knowledge is a key factor in understanding the related competencies both on individual and corporate level towards a sustainable living. If the basic knowledge in the topics is missing,

reliable and effective decisions are hard to expect; people as consumer can be either influenced or abused by profit-seeking companies.

Models of environmental conscious behavior usually use the factors of knowledge. The theory of reasoned action [3] is a base model that deduces behavior from knowledge and values (norms) through intention to behavior. Other researchers refine and enhance the concept (see [4][5][6]).

A recent survey about the perception of the content of corporate social responsibility (CSR) analyzes the attitudes and presupposition of business students [7]. The results show the CSR is a popular topic and achievable but they doubt the usefulness of the initiations in solving the global problems. Other results of the research also show contradictions and uncertainty in the opinions. This experience suggests the special importance of developing the knowledge.

Experimental

I started a survey first in 2008 to explore the attitudes and knowledge level related to environmental issues as a part of the OTKA PD71685 research entitled 'Factors and Measurement of Environmental-Consciousness' [8]. The target group was the public education and the research also involved higher education business students as a control group. A repeating survey was conducted in the higher education with the same questionnaire in 2016.

The questionnaire is a single-choice test including 22 questions about physics and chemistry, biology, geography and living. All questions come from the official training material of the elementary schools and a 10-yerars-old child can answer about the half of the questions. The questions are presented in the results and discussion section.

The research sample of 2016 includes 104 answers of business education students from various Hungarian universities. All of the respondents were born between 1990 and 1997. 42.3% of them are female.

The conclusion of the former survey said that the general level of environmental knowledge is quite poor, though the results depend on the scientific area [8]. The research aims to explore the state and characteristics in 2016.

Results and discussion

Based on the ratio of correct answers it can be stated that the knowledge about physics, chemistry and biology has deficiencies that are more serious in 2016 than in 2008.

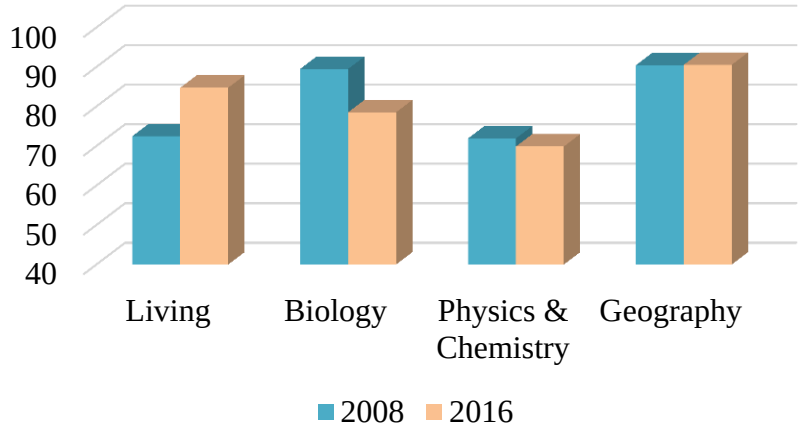

Figure 2: Survey results by knowledge are (average ratio of correct answers)

Comparing the data between 2008 [8] and 2016 there is a notable improvement in the fields of living issues and a relapse in biology (Figure 2). The independent samples T-test confirms that these differences are statistically significant (living: t=-6.051, d_f=156. sig=.000; biology t=2.861 d_f=156 sig=.005).

Table 1 summarizes shows the test questions and the ratio of correct answers in % of the samples for the total sample and by gender in 2016.

Category	Question	Total sample	Female	Male
Biology	Which animal does NOT take a quiescence?	87.5	90.9	85.0
	Which type of tree is typical in Hungary?	82.7	90.9	76.7
	Which organ is for the balance of the body?	69.2	54.5	80.0
Geography	If North is in front of me, on the left is…	93.3	93.2	93.3
	Which direction is shown by the compass?	97.1	97.7	96.7
	What is the reason for flood?	96.2	95.5	96.7
	The sea level is increased by…	98.1	97.7	98.3
	The altitude of snow line in temperate areas is…	64.4	52.3	73.3
	The color of mountains in the atlas is…	94.2	90.9	96.7
Living	How often should We have meal in a day?	72.1	81.8	65.0
	Which vitamin aids the health of bones?	71.2	68.2	73.3
	Paprika contains much of…	95.2	93.2	96.7
	Which is NOT an element of healthy living?	97.1	93.2	100.0
	Man can run in 12 minutes…	87.5	81.8	91.7
	Which makes us bronzed?	79.8	84.1	76.7
	What is the substance of selective waste collection?	90.4	97.7	85.0
Physics & Chemistry	The highest temperature on the Earth was…	65.4	61.4	68.3
	Which accelerates the melting of the arctic ice?	96.2	95.5	96.7
	Which is an important greenhouse-gas?	82.7	79.5	85.0
	Which gas effects acid rain?	90.4	90.9	90.0
	The air contains mainly…	55.8	38.6	68.3
	The pH of acid rain is…	28.8	25.0	31.7

Table 1: Survey results (ratio of correct answers in % of the samples)

Since the ratios of the correct answers shows the upper fifth in almost all questions, it is worth to focus on the weak points:

- Only 69.2% of the respondents did know that the ear is for the balance of the body. 24% think the brain.
- The snow line in our area is ca. 1,000-15,000 by 23.1% of the respondents.
- 25.9% of the respondents believe that three meals a day is ideal instead of five.
- 19% marked vitamin A as necessary for the bones.
- 7.7% is suntanned by infra and 11.5% by VHF radiation.

- There is an uncertain average opinion about the highest ever temperature. 22.1% think 80 °C and 7.7 % 45 °C.
- 55.8% of the respondents did know that the air contains mainly nitrogen, 41.3% marked oxygen.
- pH of the acid rain shows the worse result of the test. 33.7% marked pH 5-7, 28.8% pH 7-9 and 8.7% is ratio who do not know.

The bivariate correlation analysis point out that the ratio of correct answers by categories do not depend from each other. A significant correlation can be found only between living and physics & chemistry but this connection is weak (Pearson correlation=.228 N=104 sig=.020).
The distribution of the knowledge level is presented in Figure 3. 13.5% of the respondents completed the test under the two-thirds of the available points; only one person performed under a 50% level. However, 71 respondents completed the test over 80%; the number of respondent under 90% is twice as above this performance.

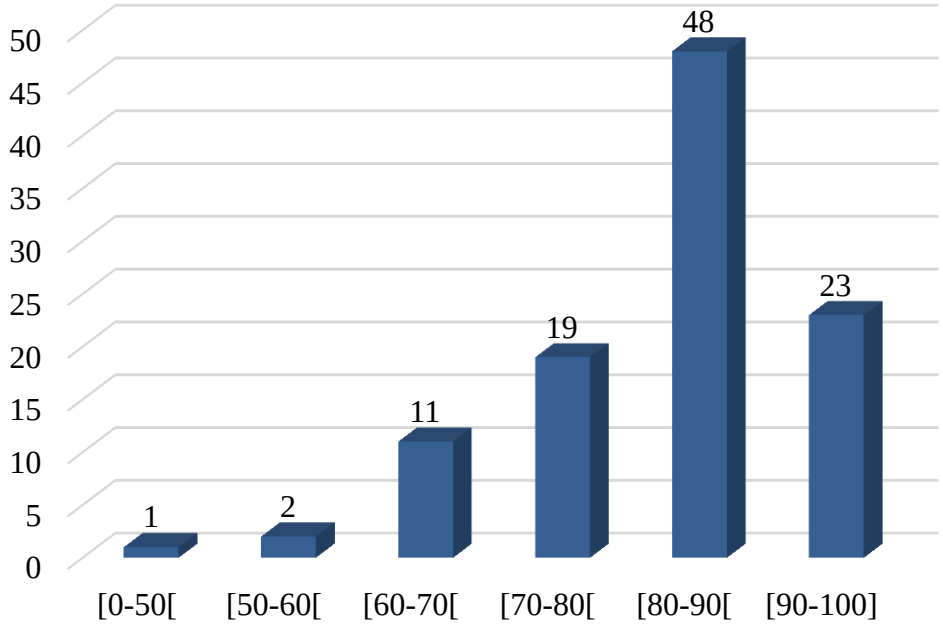

Figure 3: Distribution of individual knowledge level (in persons)

The research sample allowed comparing the knowledge level also by gender. Former research experiences in the field point out that the female respondents usually gave higher ratings, the overall picture shows a more definite and more sensitive approach of them to environmental and social problems and they have trust more in the usefulness of CSR [9].
The question comes whether there is a significant pattern in case of the knowledge level. Since the data set is different, a direct test is not feasible but comparing the tendencies may help to designate the further research activities and necessary interventions.
Females are usually better in biology, “sun-bathing”, eating issues, and selective waste collection. The independent-samples T test (Levene’s Test for equality of variances is passed) show that there is not significant difference between females and male in case of living (t=.632 d_f=102 sig=.529) and biology (t=.885 d_f=102 sig=.378) issues. Males’ knowledge level is

significantly higher in geography (t=-2.360 d_f=102 sig=.020) and physics & chemistry (t=2.090 d_f=102 sig=.039) issues in the sample.

Conclusion

The main conclusion of the survey can be formulated as adults are not smarter than a primary school student in general issues linked to the sustainable development. A simple test can show that basic knowledge of may be out of the memory, while everyday decision would need those. The results do not draw a disastrous picture but development is expected.

Moreover, further investigation is required in order to explore the reasons of the weaker performances that must include testing the knowledge at various study levels and faculties. Nevertheless, the low level of knowledge in this topic has a risk that important decisions will be made without the adequate basics.

The difference between the responsiveness of females and males gives the question whether education requires two different strategies for them or a common solution is available. I believe that common way is viable.

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