The importance of water for life on the planet: Education for Global Citizenship

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Abstract
The water shortage observed is due to the fact that the environment has undergone significant interventions that led to a qualitative degradation of water resources, overexploitation, pollution, the dropping of water level, salivation of aquifers, etc. The prevailing situation seems to be perpetuated possibly due to the interests involved, attitudes, perceptions, and lack of awareness of the seriousness of the problem. In order to solve the problem through Education for Sustainable Development, this paper is an exploratory tool of a broader research aiming to record the knowledge and views of the sample in order to develop the appropriate educational programme on issues related to the environment, water pollution, tackling water pollution, water scarcity and wastewater recovery systems. The results of the survey show that students have poor knowledge of water scarcity, water pollution, and how to deal with them, as well as the role of wastewater treatment in integrated water management.
Keywords: Water, pollution, water scarcity, Education for Global Citizenship.

1. Introduction

One of the major problems faced by many societies around the world is the lack of water sufficiency and purity in order to meet the direct and indirect living needs (Awange & Kyalo Kiema, 2019). To address the problem of water availability (Zhang et al., 2017), based on the goals that were set for clean water, sanitation, sufficiency, and efficiency of water use on Agenda 2030 (Vanham et al., 2018), substantial solutions are needed. Such as the combined use of groundwater and surface water (Ross, 2017), the exploitation of seawater (Ghaffour et al., 2013) and rainwater (Quigley et al., 2016; Ward et al., 2017), the pricing policy on public demand (Sofroniou & Bishop, 2014), the reliability of water supply systems (Richter et al., 2018), the reduction of water losses (Stavenhagen et al., 2018) and the exploitation of water recovered from sewage (Zekri et al., 2014), which in many areas reaches 5% of domestic demand (Lyu et al., 2016). With the proposed models of using recycled water in irrigation (Zhang et al., 2013) a much larger part of world demand could be covered (Lee & Tan, 2016). The result of these actions is the saving and integrated - sustainable management of water resources, with examples such as the multi-pollutant model for water quality modelling (Strokal et al., 2019) and the HF-TODIM method (Zhang & Xu, 2016). These data, with scientifically documented and cooperative studies, can contribute to sustainable production and consumption as well as to a decision-making path towards achieving the goals of sustainable development recorded in the context of UN conferences (Dongab & Hauschild, 2017).

Based on the goals of Sustainable Development Education, this paper is an exploratory tool of a broader research aiming to record the knowledge and views of the sample in order to develop the appropriate educational programme on issues related to the environment, water pollution, tackling water pollution, water scarcity and wastewater recovery systems.

2. Methodology

The methodology used is empirical, quantitative, and as a research tool the questionnaire -comprised of 16 main questions- is used as the most appropriate data collection tool (Papanastasiou & Papanastasiou, 2014). The questionnaire was appropriately designed to meet the purpose and goals of the survey (Bryman & Bell, 2015). It was distributed in January 2019 to 26 students in the second and 23 students of the third Grade High Schools of Rhodes. For the analysis of data at the level of inductive statistics, the x^2 and Levene tests were chosen in the case of the adjusted t-test value for not equal variances (Andreadakis & Vamvoukas, 2011).

3. Results

The majority of the sample is boys, with 52.2%, in 2nd Grade and 52.4% in 3rd Grade. Regarding their participation in an environmental programme, most of them (57.6% of 2nd and 65.7% of 3rd) give negative response, compared with 42.4% and 31.4% of positive participation in the respective two groups. Their information sources are the internet, family, and media. School and books are the last choices with an average of 2.26 and 2.09 respectively.

Regarding the question on their environmental knowledge, the majority is neither aware of the concept of Sustainable Development (73.3%) nor of the elements that compose the environment (86.4%). However, it should be mentioned that, on average, the

environmental crisis was considered more important than poverty and the economy, with corresponding averages being 4.5, 3.9, and 3.6.

The sample considers the policies (5.7%), the behavior of citizens (43.9%), the economic factors (6.3%) as the causes of water scarcity, while the majority did not answer (44.1%). They believe that this phenomenon could be dealt with by better policies, with an average of 2.4, by water saving with 2.5, and by using recovered wastewater with 3.2.

They also believe that pesticides and fertilizers (33.8%), factories and industries (31.1%), and urban wastewater (28.8%) are the primary sources of water pollution. 6.3% did not answer this question. The respondents consider as responsible for the pollution the people with an average of 4.2, the industry with 3.8, the politicians with 3.7, and the legislator with 3.5. They believe that pollution can be managed through regular controls (20.3%), wastewater treatment (21.2%), stricter laws, sanctions, penalties (11.8%), consumption reduction (10.9%), and other irrelevant factors (13.1%). 23.0% did not answer the question.

The majority of the students are not aware of the role of wastewater treatment (72.8%) and state as the primary recipients of sewage pollution the sea (23.5%), the atmosphere (24.8%), the soil (21.8%), the aquifer (13.1%), while 16.9% did not respond to the question.

4. Conclusions

The results of the survey show that the majority of the students of both groups do not know about the concept of Sustainable Development and the elements that compose the environment. Although they have poor knowledge of water scarcity issues, they argue that this phenomenon can be addressed by better policies, saving and using recovered wastewater. Confusion is observed in their answers regarding water pollution and how to deal with it while the majority does provide an answer. Incorrect responses and abstaining from answering confirm their lack of knowledge on the role of wastewater treatment. These findings highlight the necessity to design and implement an appropriate curriculum which provides for knowledge and environmental friendly attitudes of today's students and tomorrow's active citizens.

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