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A CASE OF STUDY ON YOUTH INTEREST IN ENVIRONMENTAL ENIGINEER PROFESSION WHICH IS IN THE HEART OF RENEWABLES

Feiza MEMET [1], Iuliana SUNDRI[2]

[1] Constanta Maritime University, Faculty of Naval Electro-Mechanics, General Engineering Sciences Dept., 104 Mircea cel Batran Street, 900663, Constanta, Romania, e-mail address: feizamemet@yahoo.com
[2] Constanta Maritime University, Faculty of Naval Electro-Mechanics, 104 Mircea cel Batran Street, 900663, Constanta, Romania, e-mail address: iuliana_sundri@yahoo.com

Abstract: Environmental engineering programs are extremely important having in view the projected job growth and the increase in global demand for solutions to face environmental challenges. Universities all over the world respond to this need by providing specialized environmental engineering degrees. It is also the case of Constanta Maritime University which is coming to reply to this request by developing the Engineering and Environmental Protection in Industry program. This is a result of the fact that there is a strong need that each of us should be informed about the environment situation, through out environmental awareness. This concept leads to public health and well being of the environment. On the other hand, we assist to population growth- process direct linked to higher energy demand. In this context, the use of renewable energy sources is of great importance since their impact on the environment is considerable less then traditional ones. This paper exposes a planned and carried out activity by Constanta Maritime University and its 4 partners- high schools with energy profile in the country. The activity called *"I choose to become a specialist in renewables"* is, in fact, a competition aiming to rank essays reflecting the vision of high school students regarding this profession, to analyze a survey conducted to assess the level of environment awareness of the young participants and to facilitate a discussion between the respondents and teachers specialized in the field. The findings are encouraging: the scientific board of the competition found motivating ideas in the presented essays and the survey revealed that the students coming from high schools with such a profile shows maturity and understanding of current environmental issues.
Key words: youth, environmental engineering, renewables, awareness.

1. INTRODUCTION

The evolution of our society lowered the quality of our life because of pollution and, implicitly, climate change. This is why, lately, a profession gained more and more importance on the labour market: environmental engineer. This important career is based on bachelor's degree in environmental engineering. Gaining the required skills during their education, environmental engineers are able to balance the development of our modern society and the wise use of natural resources. They target the desiderate of preserving Earth habitable and thriving for the next generations.

Engineering and Environmental Protection in Industry is a program of study, developed in Constanta Maritime University, aiming the specialization in applied technologies, which, through out the integration of technical and scientific knowledge, deals with the specific problems met in the fields of energy and natural environment conservation, active production, waste control. The specifics of the specialization involve deepening knowledge on Environmental Engineering in Industry, i.e. on wastewater management, combating air pollution, waste control, recycling and disposal, radiation protection, industrial hygiene, studies on the environmental impact of proposed construction projects, risk management with environmental applicability.

In order to ensure the penetration of the importance of this academic programme among young people, Constanta Maritime University makes use of the following actions:

– taking advantage of online communication and promotion opportunities by managing the university's social networks,

– promoting in the media academic, research or scientific events taking place in the faculties and the university, as well as the professional achievements of the members of the academic community,

– implementing an effective marketing strategy to increase the visibility of the University and to highlight the distinct advantages of the academic programs, by using online channels, social networks and promotional events,

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– promoting the educational offer of the faculties and admission to the various study programs, as well as informing potential candidates through the managed communication channels,
– participating in educational offer fairs and national and international scientific exhibitions,
– carrying out marketing activities within high schools and co-opting students in scientific activities, under the guidance of university teaching staff.

An important activity aiming the attraction of future professionals in the mentioned sector is the organization by Constanta Maritime University CMU), in cooperation with high schools with energy profile in the country, within a yearly scientific competition called *"I choose to become a specialist in renewables".*

This type of activity will be a good opportunity to disseminate and promote the results of teachers and students, learn about the latest achievements in the field of the topic addressed, maintain contact between specialists, stimulate students' creativity, and identify opportunities for valuable collaborations and partnerships with university education. The competition is addressed to students and teachers in activating within technological education, with the collaboration of teachers in university education. The objectives of this activity might be summarized as:
– familiarization of high schools students with the profession of environmental engineer and rise the awareness regarding the importance and use of green energy,
– developing students' interest in documentation, research, innovation and comparative analysis,
– stimulating creativity in the development and presentation of papers, reports, projects,
– presentation/ dissemination of examples of good practices, material and procedural resources, developed and applied interdisciplinary in order to support skills gain and training- according to professional training standards,
– presentation of essential data, relevant and useful information, with the aim of creating a documentation support, to support lifelong learning through improvement, orientation towards a possible future career, professional retraining or updating/diversifying knowledge and motivation for lifelong education.

The competition consists in the elaboration by the participating students, under the advice of a coordinator professor, of an essay on the announced topic. The paper will present the students' vision regarding renewable energies and the justification for their choice of a profession/specialization in this field.

Previous to the competition, high school students are provided with a scientific material on renewables, elaborated by specialised CMU staff.

After the presentation of the essays, the competitors are interviewed, thorough out a questionnaire developed by CMU staff, in order to be assessed the level of renewable energy among the young participants.

Part of the scientific board, including high school professors and CMU academic staff is evaluating and ranks the submitted essays. Resulted important ideas will be given in the next section of the paper. The other part of the scientific board is assessing the results of the survey. At the end of the competition called *"I choose to become a specialist in renewables",* will be a Discussion Session between teachers and student participating.

The number of high schools students involved was 25. Their ages vary between 17- 18 years.

2. MATERIALS AND METHODS

The development of our modern society is based on energy consumption. In present times it is vital to pay a careful attention on new energy sources, based on environmental friendly technologies, to the detriment of traditional ones: thermal, electrical or mechanical energies; renewable energy sources are those type of sources able to exist any day within the cycle of nature as a way to ensure environment protection and a healthy planet for *future generations* [1]. Technologies based on renewable energy sources are found in sectors such as electric power, heating and cooling or transport and include solar or wind power, biofuels, waves, tides, geothermal energies and so on [2].

Many studies reveal that students have a positive attitude regarding the environment [3]. The board in charge with the evaluation of the essays found interesting ideas written down by the competitors':

"I wish to become a specialist able to understand, develop and implement, both as an individual and in a team, the latest knowledge regarding the conversion of renewable energy sources, based on the accumulation of theoretical and applied knowledge under optimal technical and economic conditions".

"I would like to join the mission of identifying renewable energy resources, converting them as efficiently as possible into other types of energy, and managing and optimizing energy consumption, through knowledge of the phenomena that govern the respective field and related fields, in order to support current and future civilization".

"I am highly interested in an educational program which trains specialists in the field of renewable energies, since the job market being constantly growing and the need for well-trained people will be greater in the following years".

"I would like to study interesting topics related to energy storage, passive houses, energy efficiency, environmental audit, nanomaterials for green energy, eco nanotechnologies, simulation and modeling for renewable energy sources".

"In the future, I wish to be able to design, plan and manage construction-installation projects based entirely on renewable energy sources or/and hybrid installations (simultaneously having both classic and renewable energy sources)".

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Besides the investigation of the interest of targeted students regarding a future career in renewable energy sources, this study intends to assess the knowledge and the attitude of participants regarding renewables and endangerment of the environment. The survey presented in the following falls into many researches pointing out the importance of social responsibility in the context of seeing the human's inadequate behavior in confront with the nature [4].

3. THE SURVEY- RESULTS AND DISCUSSION

The survey is a result of investigation existing literature sources [5], [6], [7]. This survey consist in 13 statements, for which a scale between 1 and 5 rates the level of acceptance of each statement. Thus 1- means *strongly agree*, 2- means *agree*, 3- means *unsure*, 4- means mildly *disagree* and 5- means *disagree*. The 13 statements included in the survey are given below.

1. Do you agree that any individual should act environmentally conscious even if others act in an opposite way?
2. Do you agree that lockdown had a temporary positive effect on the environment, but the post- lockdown period brought back the environmental issues?
3. Do you agree with the fact that recycling can diminish the threat of global warming?
4. Do you agree that using fossil fuels in order to generate electricity led to the increase in CO_2 in the atmosphere?
5. Do you agree with the actions taken by your local authorities in respect with environment protection?
6. Do you agree that Romanian young people is more familiarized with environmental issues and renewables use than the rest of the population?
7. Do you agree that education entities, media, public authorities, stakeholders and ONGs should be more involved in create environmental awareness among young people by underlying the importance of using renewables?
8. Do you agree with an intense use of renewables in order to respond the increased energy demand?
9. Do you agree with the level of public investments in the use of renewables?
10. Do you agree that traditional forms of energy are damaging the environment?
11. Do you agree with the fact that in Romania traditional energy resources are more spread than the clean ones?
12. Do you agree that Romania has a good position and climate features in order to intensify renewable usage?
13. Do you agree to invest in solar panels to be placed on the roof of your home?

All the participants were strongly agree with the first statement, as well as in the case of the statement 2, 3 and 4. This situation reflects that the participants show a pro-environmental attitude and intention, due the fact that their educational level is linked to environmental values.

Figure 1 reflects the answers recorded for statement 5. Results that the participants perceive that local authorities are not doing enough in this sense seing insufficient action or engagement.

Figure 2 reflects the answers recorded for statement 6. During the discussion session, students said that educated young people, living in big towns might be better informed. They stated that it is important to take into consideration social aspects such as education, gender, age, socio-economic status.

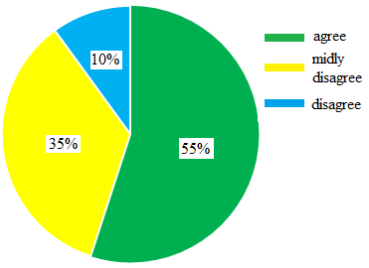

Figure 1 Replies to statement 5

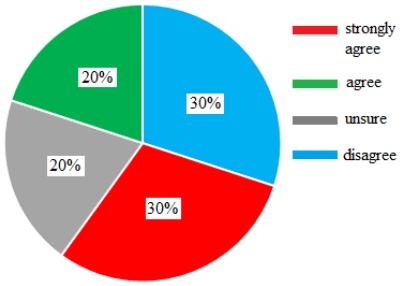

Figure 2 Replies to statement 6

Statement 7 gathered unity in answers, all of them being "strongly agree". This situation is pointing out once again how important is that all the mentioned actors should strongly collaborate to preserve a sustainable healthy environment. The same situation resulted in the case of statement 8. This reflects the fact that young people show long-term perspective on climate change and creative thinking. Answers related to statement 9 are provided in Figure 3. During discussions, students said that Romania do not respect European Commission recommendations regarding the new renewable energy target, being needed the acceleration of renewable energy projects.

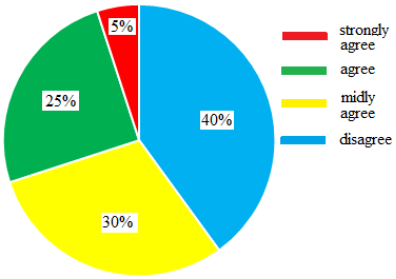

Figure 3 Replies to statement 9

The position of competitors found in the case of statement 10 is depicted in Figure 4. Students said that

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traditional energy sources are responsible for the gradually raising the overall temperature of the globe.

Another unanimity ("strongly agree") was seen in the case of statement 11. Students seemed to be well informed when they said that traditional energy sources are the most consumed energy sources in the world, not only in Romania. They wish to contribute, in the future, as professionals in finding a long term solution for the human beings to manage their existence with green energy resources.

Same unanimity ("strongly agree") was also found in the case of statement 12. Students were informed that Romania "is blessed" with a good geographic position due to its mountains, hills, plains, and seashore and possesses climate features that support important potential for renewable energy development such as solar, wind, hydropower or biomass.

Figure 5 reveals the situation regarding statement 13. The vast majority ("strongly agree") was able to support their choice with pros such as: cost savings, enhanced property value, environmental impact, energy independence, non-maintenance. [8]

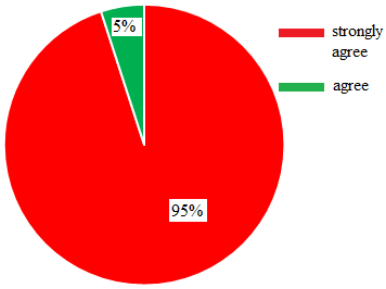

Figure 4 Replies to statement 10

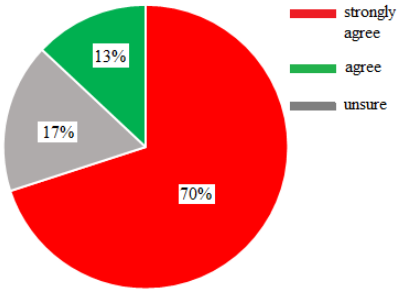

Figure 5 Replies to statement 13

The main reasons for which the rest did not tick "strongly agree" were high costs of investments, unpredictability regarding cofounding, uncertainty in respect with the location of their future home.

4. CONCLUSIONS

The main findings of this paper are summerized as:

– the participants are interested in preserving the environment seeming to be motivated to study environmental engineering;

– this type of high school students are aware of environmental issues and ready to adopt the right personal behaviour in their daily life;

– these students are enthusiastic to cooperate with their teachers and to exchange ideas in an academic environment;

– they seem to have a realistic perspective on the role of education, authorities, media in the rise of public awareness and establishment of future strategies;

– participants are a category of young people showing a positive attitude in confront with renewables.

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