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The perceptions about renewable energy among Al-Quds University students –Palestine

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Abstract

This study aims to assess the perceptions about renewable energy among The Palestinian youth. The study aimed to find out the impact of gender, specialization, accommodation, and level of learning among these students on their perceptions of renewable energy. Data was collected a total population of 371; (140) male and (231) female youth students from Al-Quds University. The Perceptions about Renewable Energy Questionnaire (PREQ) was used in this study; this questionnaire has six scales containing 35 items. In this study, PREQ was supported by the validity of factors, and alpha Cronbach reliability of the tool was found to be (0.90). The study revealed that the average elements in PREQ were (3.41) and is relatively high based on a five-point Scale of the Likert type. The result of the current study showed that there was a statistically significant difference in accommodation in students' responses to PREQ, as village students' perceptions of PREQ were more positive than their city and camp counterparts. The results also showed statistically significant differences in PREQ due to the academic level variable in favor of new students. Gender variables and student specialization have a major impact that is not important.

Keywords: The Perceptions; renewable energy; Universities; Palestinian students.

1. INTRODUCTION

Renewable energy is considered as one of the clean energy sources, it has great durability compared to traditional energy. Countries in general and individuals in particular have recently begun to focus on obtaining energy from renewable sources due to the low cost of energy production from this type of sources, as well as their conservation low level of heat emission (Abboushi et al., 2021). The perceptions that members of population have about renewable energy are important in judging the extent of society's awareness of the importance of this type of energy. It is necessary to study the different strata of society to find out their perceptions and beliefs about renewable energy to determine the steps that the educational system must take towards increasing the awareness of population members of the new trend to exploit renewable energy sources (Aiman et al., 2016).

Numerous studies worldwide dealt with the importance of renewable energy attitudes and the perceptions of students towards the use of renewable energy (Ocetkiewicza et al., 2017), these studies covered students from schools to universities, for example, Çelikler et al. (2016) found that participating students generally have a positive attitude toward renewable energy sources (Çelikler et al., 2016), more positive among scientific high school students, attitudes and perceptions of renewable energy sources (Bidwell, 2016), the previous studies have shown that people usually have a positive

perception and attitude toward renewable energy sources (Zyadin et al., 2014), some studies have found that there is a low level of energy knowledge (Martins et al., 2020, Bang et al., 2000). Al-Sabbagh (2019) investigated the public perceptions of residential solar panels in Bahrain, and the results of the study indicated that a higher level of knowledge from respondents leads to a greater willingness to pay for solar installations (Alsabbagh, 2019). Also, Di Maria et al. (2010) and Kollmuss et al. (2010) noted that people with stronger environmental preferences were more likely to invest in energy conservation techniques. Another study conducted by Muhammad-Sukki et al. (2011) indicated that most Malaysians were not aware of government incentives and policies towards renewable energies and were not willing to invest in Feed-In Tariff scheme. Wolskin (2007) conducted a study that showed that European citizens support renewable energy usage, this can be explained by the fact that people are concerned about European economies' dependence on fossil fuels. Oluoch et al. (2020) summarized that people can influence energy policy as important contributors to energy consumption by sharing their views and opinions on the benefits of renewable energy development in Kenya, so research aimed at examining people's perceptions and preferences about renewable energy can help policymakers design sustainable renewable energy policies.

Ribeiro et al. (2014) conducted a survey of public opinions on four technologies for renewable energy, solar, hydropower, biomass and wind power in Portugal, and a positive public perspective on renewable energy resources emerged. Bertsch et al. (2016) addressed the general acceptance of renewable energy in Germany, and the determinants of renewable energy adoption were examined at the national and local levels. The study results showed statistically significant differences between local and national admission levels while age and education were crucially linked to admission levels [16]. Attitudes towards renewable energy sources for students from different schools have been determined by Çelikler and Aksan (2016) in Northern Turkey. The results indicated that students participating in general had a positive attitude towards renewable energy sources and the power plants they used.

In the present study, we examined the perceptions about renewable energy among Al-Quds University students -Palestine. The importance of this work comes from that, it is the first time to examine the perceptions about renewable energy at the Palestinian universities in the West Bank.

This work was guided by the following research questions:

I. What is the Perceptions about renewable energy among Al-Quds University students?

II. Are there differences in Al-Quds University student’s perceptions about renewable energy due to gender?

III. Are there differences in Al-Quds University student’s perceptions about renewable energy due to specialization?

IV. Are there differences in Al-Quds University student’s perceptions about renewable energy due to residence?

V. Are there differences in Al-Quds University student’s perceptions about renewable energy due to academic level?

2. Methodology and dataset

The study community is made up of all students of Al Quds University (3,964 males and 6,555 females). Al Quds University is one of nine public universities in Palestine. The university's main campus is located near Jerusalem in the centre of the country, allowing for a wide geographical distribution of students. Undergraduates have four or more levels of education depending on the number of courses passed. Because (COVID-19) the university began to use built-in learning (face-to-face and e-learning). Table 1 summarizes the randomized class study sample of (140 male and 231 female students) selected according to gender.

Table 1. *Distribution of the study sample according to moderator variables (n = 371)*

Variable		Frequency	Percentage
Gender	Male	140	37.7 %
	Female	231	62.3 %
Specialization	Science	167	47.4 %
	Humanities	195	52.6 %
Residence	City	154	41.5 %
	Village	160	43.1 %
	Camp	57	15.4 %
Academic level	Freshmen	106	28.6 %
	Sophomore	78	21.0 %
	Junior	91	24.5 %
	Senior	96	25.9 %

In Palestine, the proportion of females enrolled in universities is higher than that of males, taking into account the demographic nature of the students at Al-Quds University; the sample was 62.3% females and 37.7% males. The student specialization was divided into science (47.4%) and humanities (52.6%). The student residence distribution of the sample was found to be 41.5% resident in city, 43.1% in village and 15.4% in camps, this distribution correspond with the demographic population of the Palestinians, moreover, the academic level distribution in the sample was highest for freshman with 28.6%.

In order to measure perceptions of renewable energy among Al-Quds University students the researchers developed a Questionnaire measure perceptions of renewable energy (PREQ) depending on Çelikler and Aksan (2016) scale. After developing the PREQ, the initial draft was presented to a panel of qualified and experienced education experts to verify its authenticity. Each expert was asked to present his point of view on all the terms of the questionnaire in terms of clarity. After collecting and analyzing the data, the questionnaire was modified in accordance with expert opinions. . The PERQ questionnaire contains six scales, including impacts on the environment, impacts on the organism, energy sources and their area of use, education, economy and security, resulting in a total of 35 elements. Each item contained a five-point response scale of the Likert-type ranging from 5 to 1 that represents strongly agree, agree, undecided, disagree and strongly disagree, respectively (appendix A).

The PREQ was administered to the sample by the researchers in fall semester of the scholastic year 2021 / 2022. The PREQ lasted 45 minutes to be completed. The responses were entered into a database and verified by the researchers. All the items in all the questioners were answered, we hadn't had any empty question, and the researchers presented the process of collecting data to respond to any queries by students. The results of the questionnaires were analyzed using SPSS. The descriptive statistics (averages, standard deviations and percentage) of responses to each item of the questionnaire were calculated. The t-test was used to determine variations in the averages by gender and specialization. Subsequently, one way – Anova test was used to examine whether there were statistically significant differences or not in the level of PREQ among Palestinian students due to their residence and academic level.

The PREQ credibility was measured by Chronbach's Alpha, and the results showed that reliability was (0.90), which meant that the questionnaire was appropriate to conduct such a study.

3. Results and discussion

This research attempts to examine, the perceptions of university students to renewable energy in the high academic institutions in the West Bank. When the students were asked about their perceptions about the renewable energy. The analyzed data in Table 2 shows arithmetic average of the total score is (3.41) with standard deviation (0.37). These results indicate a high degree of perceptions about renewable energy among Al-Quds University students. The six scales provide a degree ranged from moderate to high. This result could be attributed to the activity at governmental schools where the government started to install solar panels on the rooftops which might influence the student's perception.

Table 2. *Averages, standard deviations and rank order of the six domains of the questionnaire (n =372)*

Scale no.	Scale	Average	SD	Rank	Degree
1	Effects on the Environment	2.86	0.58	6	moderate
2	Effects on the Living organism	3.05	0.58	5	moderate
3	Energy Sources and their Area of Use	3.51	0.51	3	high
4	Education	3.80	0.63	1	high
5	Economy	3.72	0.55	2	high
6	Security	3.26	0.33	4	moderate
The whole instrument		3.41	0.37		high

Three indicators prove this intention, the education was rank as top indicator followed by the economy influencing their area of use "school's attitude through providing heating/cooling systems whenever renewable energy is available".

In order to understand the perception among the university students and their attitudes the researchers considered the influence of gender and field of study. The responses of the questionnaire was analyzed using the independent t-test as shown in Table 3. The results reviled that no correlation (non-significant) between gender and field of study on the renewable energy perception. This is attributed to the policy of the ministry of education as presented in table 4 showing the arithmetic average of the total score of (3.80)

Table 3. *t-test of the differences among the averages of perceptions about renewable energy due to gender.*

Variable	n	Average	S.d	t-value	Sig
Male	140	3.42	0.45	1.04	0.30
Female	231	3.38	0.30		

The analysis presented in Table 3 showed that the averages of perceptions about renewable energy for the males were (3.42), while (3.38) for females, this results of the t-test revealed a non-significant gender main effect ($t = 1.04$, $p = 0.30$).

The third question in this study was to find the impact of Al-Quds University students' specialization on their perceptions among renewable energy. This question was answered by using the independent t-test to analyze the data from the questionnaire. Table 4 provides that the averages of perceptions about renewable energy for the Humanities were (3.38), while (3.41) for Science, which means that the t-test revealed a non-significant specialization main effect ($t = 0.75$, $p = 0.45$).

Table 4. *t-test of the differences among the averages of perceptions about renewable energy due to specialization.*

Variable	n	Average	S.d	t-value	Sig
Humanities	195	3.38	0.29	0.75	0.45
Science	176	3.41	0.43		

The residence variable which answered in the fourth question (Are there differences in Al-Quds University students perceptions about renewable energy due to residence?) by using one -way Anova test to analyze the data from the questionnaire. Table 5 shows the analyzed results of the sample response due to residence. As depicted in Table 5, there is difference in average scores of the averages of perceptions about renewable energy due to residenceIn order to find out the importance of differences, a one-way Anova test was used to analyze average responses as shown in Table 6.

Table 5. *Results of average scores and standard deviations of the averages of Perceptions about renewable energy due to residence.*

residence	n	Average
City	154	3.34
Village	160	3.44
Camp	57	3.43

Table 6. *Results of one-way Anova of the responses of differences among the averages of perceptions about renewable energy due to residence.*

Source	Sum of Squares	DF	Average Square	F	Sig.
Between Groups	0.88	2	0.44		
Within Groups	49.62	368	0.135	3.28	0.03
Total	50.5	370			

According to the results in Table 6, F value was found to be (3.28) and the significant was (0.03), which is statistically significant difference in perceptions about renewable energy due to residence.

A Least Significant Difference (LSD) post hoc test was utilized to identify any statistical differences between the student groups. The LSD post hoc results are summarized in Table 7, it was found that there was a significant difference at (p = 0.05) in students' of perceptions about renewable energy due to residence between city and village in favor of village.

These results indicate that students coming from rural areas shows higher perception, and this could be attributed to several factors, open spaces which allows students to be exposed directly to the solar panels acting and interacting daily, another factor could be the power supply stability at the city where solar panels are less exposed/not applicable. Solar panels in the urban areas are constructed at high towers leading to less interaction

Table 7. *Results of post hoc test comparisons using the LSD method for independent variable levels.*

	City	Village	Camp
City	-	0.10*	0.09
Village	-	-	0.01

*p < 0.05

The academic level was one of the variable used in this work which answered in the fifth question of the study (Are there differences in Al-Quds University student's perceptions about renewable energy due to academic level?), the one -way Anova test was used to analyze the data from the questionnaire. As shown in Table 8 there is a difference in average scores of the averages of perceptions about renewable energy due to academic level. The significant of these differences was found using one –way Anova as provided by Table 9.

Table 8. *Results of average scores and standard deviations of the averages of perceptions about renewable energy due to academic level.*

Academic level	n	Average
Freshmen	106	3.49
Sophomore	78	3.38
Junior	91	3.31
Senior	96	3.38

Table 9. *Results of one-way Anova of the responses of differences among the averages of Perceptions about renewable energy due to academic level.*

Source	Sum of Squares	DF	Average Square	F	Sig.
Between Groups	1.70	3	0.57	4.26	0.006
Within Groups	48.80	367	0.13		
Total	50.5	370			

According to the results in Table 9, F value was found to be (4.26) and the significant was (0.006), which is statistically significant difference in perceptions about renewable energy due to academic level.

The LSD post hoc test was utilized to identify any statistical differences between the student groups. Table 10 summarized the LSD post hoc test, it was found that there was a significant difference at (p = 0.05) in students perceptions about renewable energy due to academic level between freshmen and sophomore, junior, and senior in favor of freshmen.

Table 10. *Results of post hoc test comparisons using the LSD method for independent variable levels*

	Freshmen	Sophomore	Junior	Senior
Freshmen	-	0.11*	0.18*	0.11*
Sophomore		-	0.07	0.00
Junior			-	0.07
Senior				-

*p < 0.05

When the researchers compared the results between three academic levels (Freshmen and Sophomore, Junior) it was clear that the freshmen students have much higher perception. This result supports the idea that education from early stage at school level impacts up the understanding the renewable energy.

4. Conclusion

In this work, for the first time, the perceptions about renewable energy among Al-Quds university students in Palestine was examined in order to formulate background information of this topic and to set a benchmark for those who would like to investigate the perceptions of the Palestinian young's to this regard and awareness to renewable energy. A questionnaire with six scales and 35 items was designed, tested and given to the students in order to study the perceptions of Palestinian youth's among renewable energy. The t-test, one -way Anova test, and Post hoc comparisons were used to compare and evaluate student responses. The questionnaire was distributed and given to 371 students from different faculties of the university. The results showed that there is a statistically significant residence difference in students' responses with village students' perceptions being more positive than that of their city and camps, this is due to that Palestinian village's uses renewable energy more than cities and camps. A significant difference was found due to the academic level variable in favor to the freshmen, this is because the government lunches the solar energy projects on the schools rooftops and the students witnessed the installation of these projects. However, gender and student specialization have a non-significant main effect.

To sum up, numerous factors have an influence on the student's perceptions among renewable energy such as education systems, study plans, the curriculum and vocational schools and family business. Finally, a considerable work from the decision makers needs to be done in the direction of integrating renewable energy concepts into the university and school curriculum in order to increase the vision of the students regarding the investment in renewable energy. Students perceptions and awareness among renewable energy can be improved through introducing more topics about renewable energy implementation in the educational system, distribute related brochures, presenting attractive movies and visiting solar fields.

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References

[1] Abboushi, N., Alsamamra, H. (2021). Achievements and barriers of renewable energy in Palestine: Highlighting Oslo Agreement as a barrier for exploiting RE resources. Renewable Energy, 177, 1-18. https://doi.org/10.1016/j.renene.2021.05.114

[2] Aiman, A., Abu Rahmeh, T., Jaber, J., Loubani, S., Abu Dalu, S., Awad, W., Dalabih, A. (2016). Renewable energy education in engineering schools in Jordan: Existing courses and level of awareness of senior students. Renewable and Sustainable Energy Reviews, 65, 3018-318. https://doi.org/10.1016/j.rser.2016.07.003

[3] Ocetkiewicza, W., Tomaszewskab, B., Mroza A. (2017). Renewable energy in education for sustainable development, The Polish experience. Renewable and Sustainable Energy Reviews, 80, 92-97. https://doi.org/10.1016/j.rser.2017.05.144

[4] Çelikler, D., Yılmaz, A., Aksan, Z. (2016). Determine the attitudes towards renewable energy sources of twelfth grade students attending different types of High Schools. Journal of Educational and Instructional Studies in the World, 6(1), 103-113. https://doi.org/10.1016/j.sciaf.2020.e00512

[5] Bidwell, D. The effects of information on public attitudes toward renewable energy. (2016) Environment and Behavior, 48(6),

743–68. https://doi.org/10.1177/0013916514554696

[6] Zyadin, A., Puhakka, A., Ahponen, P., Pelkonen, P. (2014). Secondary School students' knowledge, perceptions, and attitudes toward renewable energy in Jordan. Renewable Energy, 62, 341-348. https://doi.org/10.1016/j.renene.2012.02.002

[7] Martins, A., Madaleno. M., Dias, M. Energy literacy: What is out there to know? (2020). Energy Reports, 6(1), 454–459. https://doi.org/10.1016/j.egyr.2019.09.007

[8] Bang, H., Ellinger, A., Hadjimarcou, J., Traichal P. (2000). Consumer concern knowledge belief and attitude toward renewable energy: An application of the reasoned action theory. Psychology and Marketing, 17(6), 449–468.

[9] Alsabbagh M. (2019). Public perception toward residential solar panels in Bahrain. Energy Reports, 5, 253–261. https://doi.org/10.1016/j.egyr.2019.02.002

[10] Di Maria, C., Ferreira, S., Lazarova, E. (2010). Shedding light on the light bulb puzzle: the role of attitudes and perceptions in the adoption of energy efficient light bulbs. Scottish Journal of Political Economy, 57(1), 48–67. https://doi.org/10.2139/ssrn.1417948

[11] Kollmuss, A., Agyeman, J. (2010). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239–260. https://doi.org/10.1080/13504620220145401

[12] Muhammad-Sukki, F., Ramirez-Iniguez, R., Abu-Bakar, S., McMeekin SG, Stewart, BG. (2011). An evaluation of the installation of solar photovoltaic in residential houses in Malaysia: Past, present, and future. Energy Policy, 39, 7975–7987. https://doi.org/10.1016/j.enpol.2011.09.052

[13] Wolsink, M. (2007). Wind power implementation: The nature of public attitudes: Equity and fairness instead of ‘backyard motives’. Renewable and Sustainable Energy Reviews, 11, 1188–1207. https://doi.org/10.1016/j.rser.2005.10.005

[14] Oluoch, S., Lal, P., Susaeta, A., Vedwan, N. (2020). Assessment of public awareness, acceptance and attitudes towards renewable energy in Kenya. Scientific African, 9, 495-512. https://doi.org/10.1016/j.sciaf.2020.e00512

[15] Ribeiro, F., Ferreira, P., Araújo, M., Braga AC. (2014). Public opinion on renewable energy technologies in Portugal. Energy, 69, 39–50. https://doi.org/0.1016/j.energy.2013.10.074

[16] Bertsch, V., Hall, M., Weinhardt, C., Fichtner, W. (2016). Public acceptance and preferences related to renewable energy and grid expansion policy: empirical insights for Germany. Energy, 114, 465-477. https://doi.org/10.1016/j.energy.2016.08.022

[17] Çelikler, D., Aksan, Z. (2016). The development of an attitude scale to assess the attitudes of high school students towards renewable energy sources. Renewable and Sustainable Energy Reviews, 54, 1092-1098. https://doi.org/10.1016/j.rser.2015.10.049