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A Study on Perception and Level of Awareness of Secondary School Teachers towards Renewable Energy & Resources in Mirpur AJ&K

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ABSTRACT

This research investigates the perception and level of awareness of renewable energy and resources among secondary teachers in Mirpur, Azad Jammu and Kashmir (AJ&K). In the era of struggling with environmental challenges and energy changes, understanding how educators perceive and engage with renewable energy is of very importance. Using a survey research design, data were collected from a sample of 46 Secondary School Teachers of LA-4 Khari Sharif. The analysis of gathered data, conducted using SPSS, revealed a moderate level of awareness and perception among the respondents regarding renewable energy and resources. In light of these findings, it is recommended that renewable energy topics be integrated into the secondary school curriculum in Mirpur AJ&K. These subjects should find their place within science and environmental education courses. This step is vital for a more sustainable energy future.

Keywords: *Renewable Energy, Awareness, Perception, Secondary School, Environmental Education, Sustainability, Environmental Awareness*

INTRODUCTION

The European Association (EU) characterizes sustainable power as "energy from inexhaustible non-fossil sources, specifically wind, sunlight based, air warm, geothermal, aqueous and sea energy, hydro-power, biomass, landfill gas, sewage treatment plant gas and bio-gases" (European Commission, 2018).

In the present quickly impacting world, the issues of energy and climate have become the overwhelming focus more than ever. Our reliance on petroleum products has prompted natural corruption as well as filled worries about the drawn out accessibility of these limited assets. The undeniable evidence of climate change, from outrageous weather events to rising ocean levels, fills in as the need might arise to

progress towards more sustainable energy sources. This is where renewable energy becomes possibly the most important factor.

As specialists like Mark Z. Jacobson, a teacher of common and natural designing at Stanford College, stated in his research, renewable energy sources, for example, sun based, wind, and hydroelectric power, offer a promising answer for both our energy and environment challenges. These sources are plentiful as well as produce insignificant to no ozone depleting substance discharges, subsequently introducing a method for relieving the impacts of environmental change while guaranteeing a cleaner and safer energy future. (Jacobson, *et al.,* 2017).

Relationship between Renewable Energy and Education

The promotion of renewable energy relies heavily on education. People and communities are more likely to use renewable energy in their daily lives as they learn more about its advantages. Reducing one's energy use and investing in renewable energy sources like solar panels are two examples of this. At the community and government levels, education can also assist in gaining support for renewable energy policies and initiatives. Schools and educational institutions are progressively integrating sustainable power training into their educational plans. Teaching students about renewable energy sources, the advantages of using renewable energy, and the significance of using sustainable energy practices are all part of this. Renewable Energy education can likewise move students to seek careers in the renewable energy area, driving development and progress in the business.

Education is a critical component and a keystone to any country's advancement; it invigorates logical undertaking, improves livelihoods, and infuses a gifted labor force into the resultant present day work market. For sure, it very well might be said that education braces a country and cultivates the strength expected to face unexpected difficulties or unpropitious circumstances. education may likewise ingrain the youth with the essential information and moral obligation expected to all the more likely comprehend and tackle ecological issues, particularly those connected with energy age (Jennings, 2019). It is exceptionally basic to teach young generation as they will become future forerunners in the decade to come. Individuals who absence of information are in the place of judging, so this occasionally can be brought about misjudgments that cause harm for investors and makes an issue about the creation of RE (Altuntas & Turan, 2018).

Teacher's Perception about Renewable Energy

Zaman, *et al.*, (2021) investigated that teachers in Pakistan had a high level of knowledge about the technologies used in renewable energy and how they perceive renewable energy. However, they lacked the practical skills necessary for the installation and upkeep of renewable energy. Teachers also believed that renewable energy could help alleviate the energy crisis and lessen the impact of fossil fuels on the environment, according to the study.
Irfan, *et al.,* (2021) looked on the barriers to renewable energy adoption in Pakistan. The main obstacles to the country's implementation of renewable energy were a lack of awareness, inadequate government support, and inadequate financing. The concentrate likewise uncovered that educators could assume an essential part in advancing sustainable power by teaching understudies and the general population about its advantages.

Ziyadin, *et al.,* (2012) carried out 260 questionnaires from secondary teachers in Jordan expecting to investigate their insight, perceptions, and attitudes toward RE development. The findings uncovered that teachers have limited information on RE and neutral perceptions in regards to its utilization. Male

educators displayed marginally higher information on RE and female instructors held more grounded inspirational perspectives. Various socio-demographic and work related factors didn't impact the educators' perceptions and perspectives toward RE. It was likewise found that teachers require personal training in regards to RE before it is brought into school educational programs.

School students in Jordan have restricted capacity to recognize between RE sources and non-renewable ones. They have positive attitude and inclination to embrace RE, but understudies had some misconceptions of energy issues, for example nuclear power. It is consequently important to investigate the educators' information and perceptions toward RE to create a more clear comprehension of the role of education, and to conceivably recognize disconnects among teachers and students (Ziyadin, *et al.,* 2012).

Liarakou, *et al.,* (2009) investigated perceptions and attitudes of secondary teachers in Greece towards RE sources, especially wind and sun energy systems. Both open and close questions were utilized as methodological instrument. Findings uncovered despite the fact that teachers were educated about RE sources and well disposed towards these sources, they hardly communicated clear positions in regards to a few issues about wind and sun based energy innovations and farms. These themes are restricted coordinated in showing either as extra-curricular instructive projects or through the curriculum. These findings can't affirm that instructors could impact students' perception towards RE system.

Spiropoulou, *et al.,* (2007) investigated research concerning Greek in-service primary educators' perceptions about environmental issues and attitudes towards Education for Sustainable Development. A questionnaire with different questions was utilized to acquire exhaustive comprehension of their viewpoints. The analysis of information uncovered that educators hold wrong assumptions or misguided judgments of the terms "sustainability" and "RE sources". Moreover, the execution rate of environmental projects in schools is somewhat low thinking about educators' interest in the issues. This is because of absence of experience with new strategic methodologies which advance natural matters. By considering these findings, potential ramifications emerging from supporting educators to carry out ecological projects in schools are talked about and ideas for beating the illustrated troubles are made.

Teachers's Awareness about Renewable Energy

According to Tariq, *et al.,* (2021) most of secondary school teachers in Punjab, Pakistan, need awareness and information about renewable energy. The investigation discovered that just 29% of the teachers knew about the term 'sustainable power,' and just 16% had some awareness of solar energy. In addition, 80% of teachers were of the opinion that renewable energy was prohibitively expensive for the general public.

On the other hand, efforts are being made to raise students' and teachers' awareness of renewable energy. For example, the Punjab Energy Department has sent off a program to prepare 17,000 teachers in renewable energy and energy conservation. The program's goal is to teach teachers and students about energy conservation, renewable energy, and protecting the environment.

Moreover, the Pakistan Council of Renewable Energy Technologies (PCRET) has sent off a program to advance sustainable power training in schools and universities. The program gives preparing and instructive material to instructors and students on sustainable power advancements, for example, solar, wind, biomass, and hydro-power.

Guven, *et al.,* (2017) investigated the awareness and knowledge on pre-service educators with respect to RE. 196 pre-service educators learning at four different teaching profession departments in a state funded college in Turkey's Mugla territory were participants. RE Awareness Scale and RE Knowledge Level

Test" were utilized to gather the information from the pre-service instructors. The outcomes uncovered that the information level of the pre-service educators in regards to RE showed contrasts across the divisions while their awareness didn't shift. It was likewise observed that the pre-service educators' information level and awareness in this subject had a positive relationship. Accordingly, this point should be given significance in the training programs should be executed all the more successfully and definitively. Also, more complete data with respect to RE issues should be remembered for the teacher training.

Derasid, *et al.,* (2021) stated the information and awareness of government policy execution and support for RE in light of the reactions from in-service science educators and polytechnic teachers. A questionnaire from 117 science educators and 90 polytechnic was undertaken. Findings uncovered that the two gatherings have great and positive awareness, adequate information on RE and a top to bottom comprehension of government strategies on supporting and executing RE. At last, contrasts connected to gender and teaching experience while showing RE inside their instructive foundations were not huge.

Conceptual Framework
Knowledge, Attitude, Behavior (KAB) Model

The Knowledge, Attitude, and Behavior (KAB) model is a psychological framework used to comprehend and analyze the variables impacting human activities and choices. It sets that knowledge about a specific subject or circumstance, alongside a individual's attitude or beliefs towards it, straightforwardly shape their ways of behaving and activities. This model proposes that rising information alone could not be guaranteed to prompt social change; rather, the change of attitude and beliefs is additionally crucial for drive wanted activities. The KAB model has been applied in different fields, like health advancement and education, to direct mediation that expects to achieve positive social changes by tending to each of the three parts: knowledge, attitude, and behavior.

The Knowledge-Attitude-Behavior (KAB) model fills in as a fundamental system to comprehend how knowledge, attitudes, and behavior cooperate inside the setting of RE awareness among secondary teachers. This model is fundamental for exploring the degree to which teachers have exact data about RE sources, how their insights impact their perceptions, and how these attitudes drive their activities towards sustainable power adoption. The "knowledge" part of the KAB model relates to the comprehension and awareness with RE and its resources among secondary teachers. Investigating their knowledge level is pivotal to understanding their ability to educate and find out about RE successfully, (Smith, *et al.,* 2016) This angle connects straightforwardly to my research, which centers around surveying the perception and level of awareness of these partners in regards to RE. The "Attitude" part of the KAB model relates to the sentiments, assessments, and opinions of secondary teachers towards RE. Exploring their attitudes towards RE resources can give bits of knowledge into the probability of incorporating RE ideas into the educational program and day to day rehearses (Stern, 2000). The "behavior" part of the KAB model includes analyzing the activities of secondary teachers connected with RE. Grasping their ways of behaving in teaching methods, classroom discussions, and personal energy utilization can give experiences into the practical use of their awareness and attitudes (Kollmuss, *et al.,* 2002).

Theoretical Framework

The Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is a psychological model developed by Icek Ajzen that tries to make sense of and predict human behavior by thinking about the impact of a individual's attitude,

subjective norms, and perceived behavioral control. As per TPB, individuals' intentions to engage in a particular behavior are driven by their own beliefs about the behavior's results (attitude), their view of social burdens and assumptions connected with the behavior (subjective norms), and their apparent capacity to beat obstructions and effectively perform behavior (perceived behavioral control). These elements by and large shape a person's behavioral expectations and, in this way, their real behavior. TPB gives bits of knowledge into how individuals decide and make moves in light of their inside beliefs and outer influences. With regards to TPB, "attitude" refers to a person's general assessment of performing a behavior. In this research, this means surveying the perspectives of educators towards RE and RE resources. Investigating how positive or pessimistic attitudes impact their intentions to remember RE concepts for instructing and individual practices. (Ajzen, 1991). "Subjective Norms" refers to a individual's view of prevailing difficulties or assumptions from significant others to perform or not perform a behavior. In this research, this includes analyzing the impact of the assessments of friends, partners, and relatives on the goal of educators to embrace RE practices. (Sheeran, *et al.,* 1999)."Perceived Behavioral control" alludes to a singular's impression of the straightforwardness or trouble of performing a behavior. With regards to my research, this involves investigating how certain educators about incorporating RE ideas into education and everyday practices (Ajzen, 2002). TPB stresses that behavior intention — a mix of attitude, subjective norms, and perceived behavioral control — firmly predicts behavior. The Theory of Planned Behavior (TPB) offers a powerful structure for understanding the intention and behavior of secondary teachers with respect to RE. By analyzing their attitudes, subjective norms, perceived behavioral control, and behavioral intention, you gain bits of knowledge into the factors that impact their dynamic cycle. This structure is exceptionally pertinent as it empowers to dig into the psychological determinants driving the perception and level of awareness to RE among instructors.

Renewable energy sources such as solar, wind, hydro, geothermal, and biomass have the potential to provide sustainable energy for the future and achievement of SDGs. However, the adoption and implementation of these technologies depend on the awareness and perception of renewable energy among individuals. The education sector plays a crucial role in creating awareness and promoting the use of renewable energy, and secondary schools are an important platform to achieve this objective. Therefore, the researcher investigates the perceptions and level of awareness of secondary school teachers towards renewable energy and renewable energy resources in Mirpur AJ&K.

Research Objectives

1. To investigate the perception of secondary school teachers towards renewable energy and renewable energy resources.
2. To assess the level of awareness of secondary school teachers towards renewable energy and renewable energy resources.

Research Questions

1. What is the perception of secondary school teachers towards renewable energy and renewable energy resources?
2. What is the level of awareness of secondary school teachers towards renewable energy and renewable energy resources?

METHODS AND MATERIALS

The investigator used survey design to gather the opinion of secondary school teachers about the current phenomena. Cross-sectional survey design was used. The total population of this research study was the 24 Government schools of LA-4 comprising 14 girls and 10 boys high school. 08 schools were selected as

a target population of the research from which sample was drawn. The selection of a sample from the population was made using the L.R. Gay and Slovin's formula. The sample researcher got was 46 secondary students from 08 schools. In this study, the researcher used a questionnaire as an exploration tool. It is regularly used in survey study to assemble information. The questionnaire was divided into three parts: part A, which deals with the demographic and personal information and part B, which contains dichotomous questions and part C contains Likert's scale items. In this study, the researcher used the SPSS software and pilot testing to ensure the reliability of the research tool. Cronbach alpha coefficient showed the internal reliability of research instrument in the pilot-test phase. The value of 0.7 as Cronbach alpha coefficient is considered as the reliable value for any research instrument (Creswell, 2012). With reference to this concept in the current study, the Cronbach value for pilot-testing was 0.795 which was considered reliable and hence the research instrument for current study was carried out.

DATA ANALYSIS

In this research, researcher analyze the data using descriptive analysis, the results have been described in the form of tables. The data was collected from total 254 students from 08 secondary schools.

Table 01: Fossil fuels are type of renewable energy resources.

	N	Mean	Std. Deviation
Fossil fuels are type of renewable energy resources.	46	3.5652	1.06775

The minimum score given by the teachers was 2.00, while the maximum score was 5.00. The mean score indicates an average perception of 3.5652.

Table 02: I have idea that traditional energy resources are destroying the environment.

	N	Mean	Std. Deviation
I have idea that traditional energy resources are destroying the environment.	46	3.3261	1.05524

The mean score for the item was 3.3261, indicating that on average; the teachers had a moderate level of agreement that traditional energy resources are damaging the environment.

Table 03: I use fossil fuels and have idea that they are dangerous for the environment.

	N	Mean	Std. Deviation
I use fossil fuels and have idea that they are dangerous for the environment.	46	2.9783	.97728

On average, the teachers had a mean score of 2.9783, suggesting a moderate level of awareness.

Table 04: I care whether the resources are renewable or non-renewable.

	N	Mean	Std. Deviation
I care whether the resources are renewable or non-renewable.	46	3.5870	.80488

A survey questionnaire conducted among secondary school students regarding their concerns about the renewable or non-renewable nature of resources. The teachers expressed a moderate level of concern, with a mean score of 3.5870.

Table 05: Do you think that renewable energy awareness should be included as a part of teacher training programs?

	Frequency	Percent	Cumulative Percent
Yes	31	67.4	67.4

31 teachers, or 67.4%, out of the total 46 teachers gave a "Yes" response, indicating their support for including awareness of renewable energy in teacher training.

Table 06: Do you think that renewable energy policies should be made and implemented?

	Frequency	Percent	Cumulative Percent
Yes	42	91.3	91.3

Out of the total 46 teachers, 42 (or 91.3%) answered "Yes" to the question, indicating that they support the creation and implementation of renewable energy policies.

DISCUSSION

The findings of this study show that teachers have a moderate understanding of fossil fuels and renewable energy. Many teachers were not fully clear about the fact that fossil fuels are non-renewable, which shows a gap in basic energy education. While they agreed to some extent that fossil fuels harm the environment, their awareness of the dangers was also moderate. This means that although teachers have some knowledge, there is still room for improvement in how energy topics are understood, especially when it comes to the difference between renewable and non-renewable resources. On a positive note, most teachers strongly supported adding renewable energy topics to teacher training programs. They also agreed with the idea of having clear policies that promote renewable energy in education. This shows that teachers are open to learning more and want to teach their students about energy in a better way. These results highlight the need for better teacher training and updated educational content so that teachers can confidently teach about energy issues and help raise environmental awareness among students.

CONCLUSION

The analysis of teachers' perceptions regarding fossil fuels and renewable energy revealed several key insights. Teachers demonstrated a moderate perception that fossil fuels are renewable and showed a moderate level of agreement that traditional energy resources harm the environment. Their awareness of

the dangers posed by fossil fuels was moderate, as was their concern for whether resources are renewable or non-renewable. Furthermore, a significant majority of teachers supported the inclusion of renewable energy awareness in teacher training programs and favored the creation and implementation of renewable energy policies. These findings suggest that while teachers recognize the environmental impact of traditional energy resources, there is strong support for educational and policy measures to promote renewable energy awareness and practices.

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