What do college students think about nuclear energy?

Matthew Hammett, Andrew Gatch, Christie Kueneman
School of the Earth, Ocean and Environment, University of South Carolina, Columbia, SC, 29208
mhammett@email.sc.edu, agatch@email.sc.edu, clk@email.sc.edu

Abstract

The purpose of this research was to find out what college students know about Nuclear Power Plants, their safety regulations, how sustainable they are, their future viability, and where their waste disposal occurs. A group of almost 90 students were ask five questions in order to help determine this information and see exactly how well they are informed on the current energy source. The data collected was then analyzed and cataloged into the tables shown to the right which will help interpret what exactly was found by the interviewers. The reasons why this is important for this generation and the following generations to know is because as Nuclear Energy becomes a growing resource for a larger percentage of energy production in the US today citizens should know about its importance and how safe or unsafe it can be. This topic is also important because people show know about and learn how beneficial and clean nuclear energy can and then be able to weigh the pros and cons when helping decide whether or not to continue with this energy source.

Introduction

The use of Nuclear Energy from nuclear power plants is a growing source of energy usage around the world due to it having an excellent balance of clean and efficient energy. One of the articles reviewed [4] described a statistical analysis of various nuclear accidents and their frequencies. They found that accidents have decreased dramatically over the years and the calculated current average is around 0.003 events per plant per year. While this sounds very low, there is a considerable risk for future catastrophic events, similar to Chernobyl or Fukushima, because of the unpredictability of climate and natural disasters. Pearce [6] also analyzed obstacles in moving forward in nuclear energy and showed that companies must convince the public of better safety regulations and work to eliminate the risks and wastes associated with this form of energy. Saleh and Bayoumi [5] described new methods of aiding in the disposal of nuclear waste through green composites. Through this specific class of bio composites there is growing research in naturally decomposing waste to avoid contamination. There is plenty of industry research occurring to counteract accidents and negative aspects of nuclear energy overall.

Relevance

In the state of South Carolina there are already seven nuclear plants and there is plenty of availability for more plants to be made in the state to help produce cleaner energy. It is important for students to know about this energy source so that they can be knowledgeable in the pros and cons that come with this energy source and where it can be most used in the state. It is also important because they are the future that will vote on whether or not it is safe to have any more in the area so they should know what they are actually voting for.

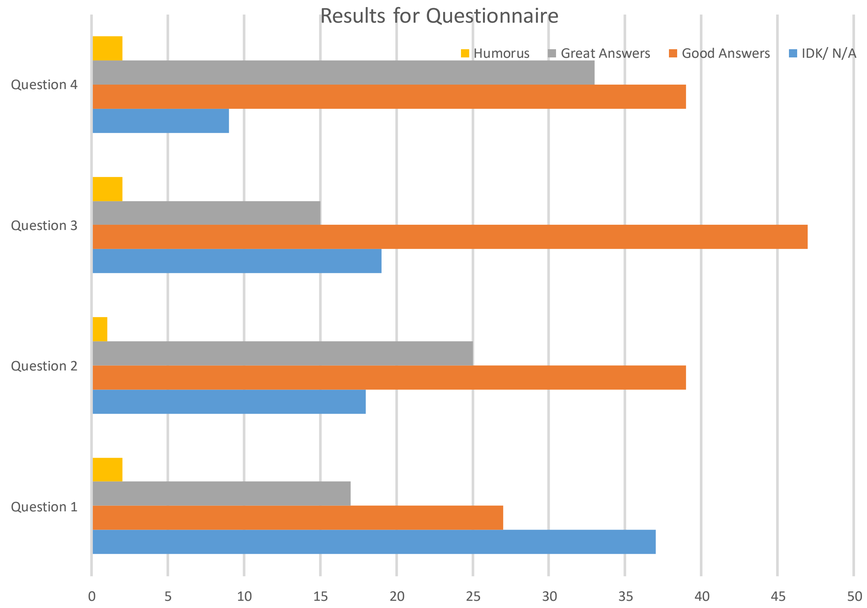
Methods

The questions we used to gather the presented data are as follows:

1. On a scale from 1 (not at all familiar) to 5 (very familiar), how familiar are you with current nuclear power-plant safety regulations?
2. If familiar, what do you think about current nuclear power-plant safety regulations?
3. How do you think the location of a nuclear power-plant is determined?
4. How do you think decisions are made about where nuclear waste is disposed of?
5. Why, or why don't, you think nuclear energy is a sustainable form of energy for the future?

This survey was distributed through a Google Questionnaire emailed to several different groups in the student body.

Graph 1

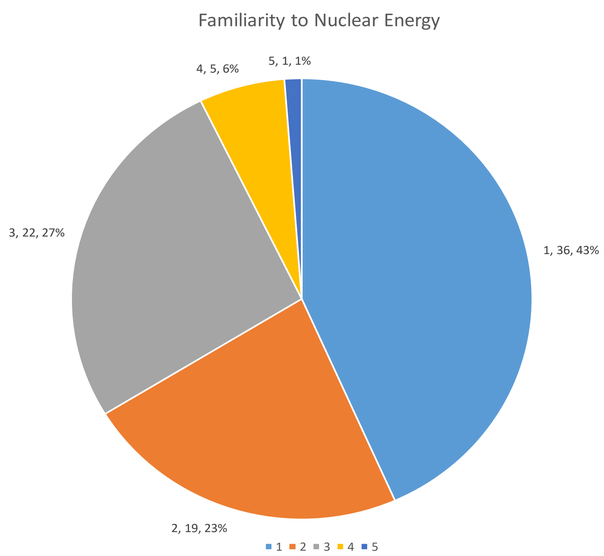


In the graph above (Graph 1), the data displayed corresponds with the questions in the questionnaire mentioned in the "Methods" section. For each response there are four categories; Humorous, Great Answer, Good Answer, and I Don't Know/ Not Available. Responses were judged as followed:

- Humorous means the student sent in a response meant to get a laugh out of the reader/interviewer.
- Great Answers were those that explained thoroughly their response and went along with the research done by the Interviewer.
- Good Answers were responses that were similar to Great Answers but did not go into as much detail.
- IDK/N/A were responses that were left blank or the responder was not sure about the subject or question asked.

Any derogatory responses were removed from the study

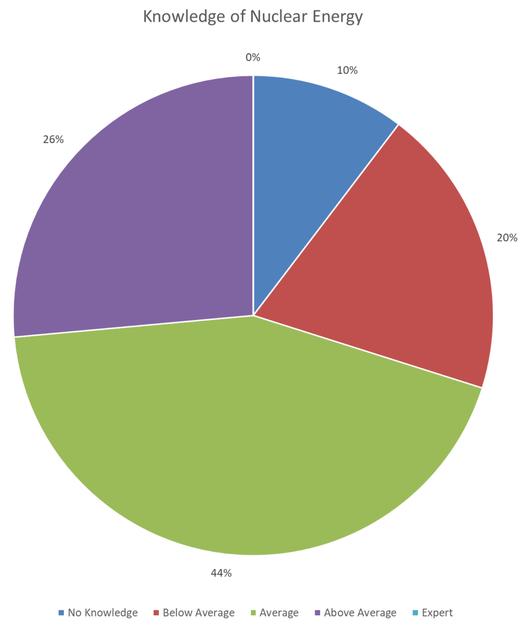
Graph 2



Graph 2 represents the students' familiarity with the current nuclear power-plant regulations on a scale from 1 to 5.

Graph 3 represents the overall knowledge students displayed about the topic of Nuclear Energy and its safety regulations, viability, and disposal methods. These responses were categorized as:

- No Knowledge
- Below Average Knowledge
- Average Knowledge
- Above Average Knowledge
- Expert Knowledge



Graph 3

Discussion

In the shown results most students that answered the survey had a basic idea about where and how nuclear waste is disposed and also whether or not it is a sustainable source of energy for the future. What students did not understand as much were the regulations and safety concerns built around setting up and running Nuclear Power Plants. Several students were unsure about how much safety is built around nuclear energy and whether or not it is actually safe to have around population dense places. While the majority of students did not know many of the major aspects of safety regarding power plants, the general consensus regarding the future usage was that they believed it would be a viable energy source if there were ways to ensure less accidents and waste contamination that could affect the public. We suggest that not only should the EPA and local governments educate citizens more on the importance, safety, and viability of the source of energy, but there should be longer programs in the education system to address this type and other types of energy sources that are available today.

Conclusions/Future Directions

- Over 50% of college students are unaware or barely familiar with the safety regulations involved with setting up and running Nuclear Plants
- Most of these students knew less, if anything, about the safety regulations but knew a decent amount about the risk involved with Power Plants and their future viability as show in Graph 1.
- Nuclear Energy is one of the growing sources for energy in the US but most Students do not know about its importance in changing the environment.
- Information regarding alternative energy sources should be implemented into school curriculum to educate younger people about possibilities and societal energy decisions.

References

1. Ewing, R. C., Whittleston, R. A., & Yardley, B. W. (2016). Geological Disposal of Nuclear Waste: A Primer. *Elements,12*(4), 233-237. doi:10.2113/gselements.12.4.233

2. Schwenk-Ferrero, A., & Andrianov, A. (2017). Nuclear Waste Management Decision-Making Support with MCDA. *Science and Technology of Nuclear Installations,12*, 1-20. doi:10.1155/2017/9029406

3. Space, W. (2015). EPAs Clean Power Plan: What to Do about Nuclear Power? *The Electricity Journal,28*(2), 10-16. doi:10.1016/j.tej.2015.02.00

4. Wheatley, Spencer. (2016). "Reassessing the Safety of Nuclear Power." ScienceDirect, Elsevier, 15, 96-100.

5. Saleh HM, Bayoumi TA (2017) Applications of Green Composites in Immobilization of Radioactive Wastes and Others- A Review. J Nucl Ene Sci Power Generat Technol 6:4. doi: 10.4172/2325-9809.1000177

6. Pearce, J. (2012). Limitations of Nuclear Power as a Sustainable Energy Source. *Open Access Sustainibility,* 4, 1173-1187; doi:10.3390/su4061173

7. Cardwell, Diane. "Nuclear Plants, Despite Safety Concerns, Gain Support as Clean Energy Sources." The New York Times, The New York Times, 1 June 2016.