

Developing a Broad Measure of Undergraduate Students' Sustainability and Renewable Energy Knowledge and Perspectives

Hang Song¹, Karen McNeal¹, Lauren Beckingham², John Solomon³, Kelly Lazar⁴



Introduction

- It is vital to study undergraduate student's attitudes about renewable energy application
- Students need to be aware of sustainable engineering as an optional career pathway
- Quantitative survey was designed to determine to participate student renewable energy knowledge and perceptions
- The survey has five different sections to study five areas of the undergraduate students' attitudes and fundamental knowledge

Surveys

- Five sections**
- S1: Multiple choice questions about the basic knowledge on global warming/renewable energy application (6 questions)
- S2: Students attribute about 12 statements on renewable energy (12 questions)
- S3: Test the possibility that the students would like to change their behaviors to save energy (9 questions)
- S4: Test how much the renewal energy could influence students' future job hunting (6 questions)
- S5: Students were asked to grade the agreement about the list of abilities in the workplace. (19 questions)
- Survey Background**
- Two schools: Auburn University & Tuskegee University
- Period: 9/2021-5/2022
- Pre-test: at the beginning of each semester, students were asked to join the pre-test.
- Post-test: before the end of each semester, students (some groups) were asked to join the SAME test again. (2-month gap)
- Survey result analysis:**
- In total: 224 results (128 Pre and 96 Post) 84 attended both pre & post
- Auburn: 128; Tuskegee: 96
- Male: 161; Female: 61; Others: 2
- Freshman: 38, Sophomore: 67, Junior: 58, Senior: 55, Others: 5

Result

Paired Samples Statistics					Paired Samples Statistics					Paired Samples Statistics					Paired Samples Statistics								
Pair	Pre	Post	Mean	Std. Deviation	Std. Error Mean	Pair	Pre	Post	Mean	Std. Deviation	Std. Error Mean	Pair	Pre	Post	Mean	Std. Deviation	Std. Error Mean	Pair	Pre	Post	Mean	Std. Deviation	Std. Error Mean
Pair 1	PreQ101	9398 ^a	83	23938	0.2628	Pair 1	PreQ301	37831 ^a	83	132562	14551	Pair 1	PreQ101	9398 ^a	83	105477	11578	Pair 1	PreQ101	9398 ^a	83	105477	11578
	PostQ101	9398 ^a	83	23938	0.2628		PostQ301	37831 ^a	83	132562	14551		PostQ101	9398 ^a	83	105477	11578		PostQ101	9398 ^a	83	105477	11578
Pair 2	PreQ102	9277 ^a	83	26054	0.2860	Pair 2	PreQ302	42892 ^a	83	122504	13447	Pair 2	PreQ102	9277 ^a	83	130324	11341	Pair 2	PreQ102	9277 ^a	83	130324	11341
	PostQ102	9277 ^a	83	26054	0.2860		PostQ302	42892 ^a	83	122504	13447		PostQ102	9277 ^a	83	130324	11341		PostQ102	9277 ^a	83	130324	11341
Pair 3	PreQ103	6867 ^a	83	46664	0.5122	Pair 3	PreQ303	53255 ^a	83	79375	89241	Pair 3	PreQ103	6867 ^a	83	12696	12037	Pair 3	PreQ103	6867 ^a	83	12696	12037
	PostQ103	6867 ^a	83	46664	0.5122		PostQ303	53255 ^a	83	79375	89241		PostQ103	6867 ^a	83	12696	12037		PostQ103	6867 ^a	83	12696	12037
Pair 4	PreQ104	8072 ^a	83	39687	0.4356	Pair 4	PreQ304	43735 ^a	83	128510	14106	Pair 4	PreQ104	8072 ^a	83	39687	0.4356	Pair 4	PreQ104	8072 ^a	83	39687	0.4356
	PostQ104	8072 ^a	83	39687	0.4356		PostQ304	43735 ^a	83	128510	14106		PostQ104	8072 ^a	83	39687	0.4356		PostQ104	8072 ^a	83	39687	0.4356
Pair 5	PreQ105	3735 ^a	83	48667	0.5342	Pair 5	PreQ305	42892 ^a	83	148555	16310	Pair 5	PreQ105	3735 ^a	83	48667	0.5342	Pair 5	PreQ105	3735 ^a	83	48667	0.5342
	PostQ105	3735 ^a	83	48667	0.5342		PostQ305	42892 ^a	83	148555	16310		PostQ105	3735 ^a	83	48667	0.5342		PostQ105	3735 ^a	83	48667	0.5342
Pair 6	PreQ106	8795 ^a	83	32750	0.3595	Pair 6	PreQ306	42892 ^a	83	111570	12246	Pair 6	PreQ106	8795 ^a	83	32750	0.3595	Pair 6	PreQ106	8795 ^a	83	32750	0.3595
	PostQ106	8795 ^a	83	32750	0.3595		PostQ306	42892 ^a	83	111570	12246		PostQ106	8795 ^a	83	32750	0.3595		PostQ106	8795 ^a	83	32750	0.3595

^a The correlation and t cannot be computed because the standard error of the difference is 0.

		Mean		Std. Deviation	Std. Error	Interval of the Difference	t	df	Sig. (2-tailed)
Pair 1	PreS1 - PostS1	-0.02008	0.08542	0.03487	-0.10972	0.06956	-0.576	5	0.590
Pair 2	PreS2 - PostS2	-0.04719	0.07833	0.02261	-0.09696	0.00258	-2.087	11	0.061
Pair 3	PreS3 - PostS3	-0.10174	0.15722	0.05241	-0.22259	0.01911	-1.941	8	0.088
Pair 4	PreS4 - PostS4	0.00000	0.10166	0.04150	-0.10669	0.10669	0.000	5	1.000
Pair 5	PreS5 - PostS5	-0.11312	0.10911	0.02572	-0.16738	-0.05886	-4.398	17	0.000

^a The correlation and t cannot be computed because the standard error of the difference is 0.

Fig. 1-6 Paired T test for Section 1-5 and overall (from left to right)

Conclusion

Overall Conclusion

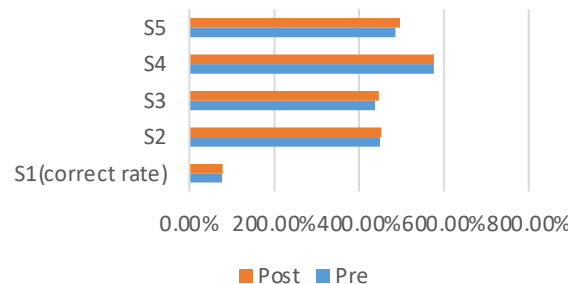


Figure 7. Overall Conclusion of the 1-year data

Future work

- Data in the new semester is collecting
- Add a new question: we ask the participants to rank the top 9 abilities they considered most helpful in their future career
- Similar questions will also ask the stakeholders; we will compare the difference between the undergraduate student and stakeholders

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¹Department of Geoscience, Auburn University, Auburn, AL, 36830
²Department of Civil and Environmental Engineering, Auburn University, AL, 36830
³Department of Mechanical Engineering, Tuskegee University, AL, 36083
⁴Department of Engineering and Science Education, Clemson University, SC, 29634