

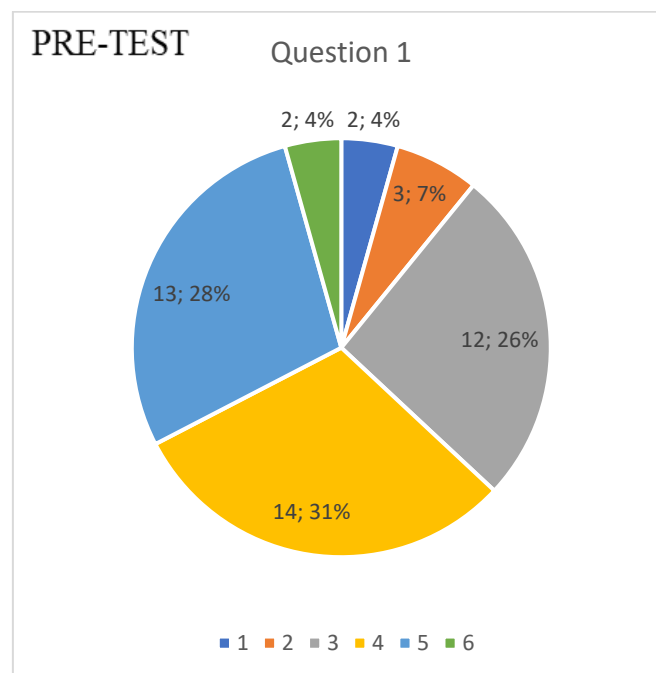
Analysis of Pre-test and Final-test results of the IPT training on PVT systems (Addendum to the IPT report delivered on June 20, 2022)

Mário Gomes
June 30, 2022

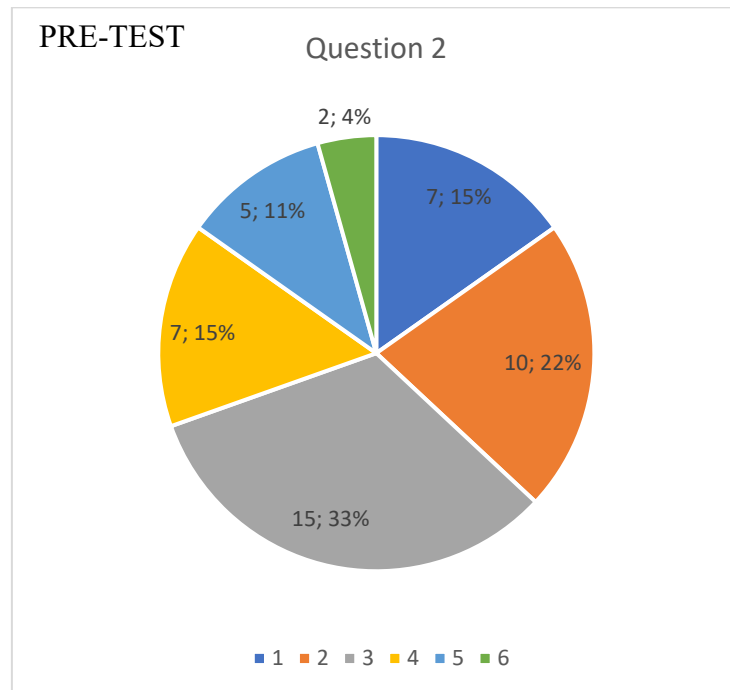
In accordance with the project commitment, the Instituto Politécnico de Tomar, Portugal, conducted a training on PVT systems (O4 intellectual output), from 27th May and 15th June 2022, which included two surveys (Pre-test and Final-test). 46 IPT students participated in the Pre-test survey of which 44 students participated in the full training (held the Final-test). These students are from different IPT study programs: Higher professional technical course on Mechatronics (level 5), Bachelor on Mechanical Engineering, Bachelor on Electrical and Computation Engineering and Master on Electrical Engineering. The testing was realized both distance and face to face.

QUESTION ANALYSIS

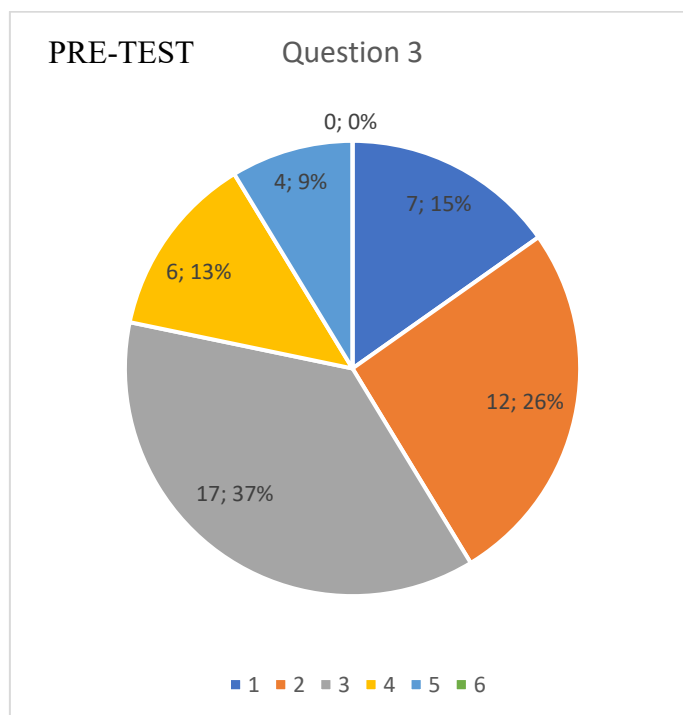
Question 1. (*Question before training*) How would you describe your level of knowledge regarding the use of ICT technologies? (1 = Not at all; 5 = Absolutely; 6 = N/A)



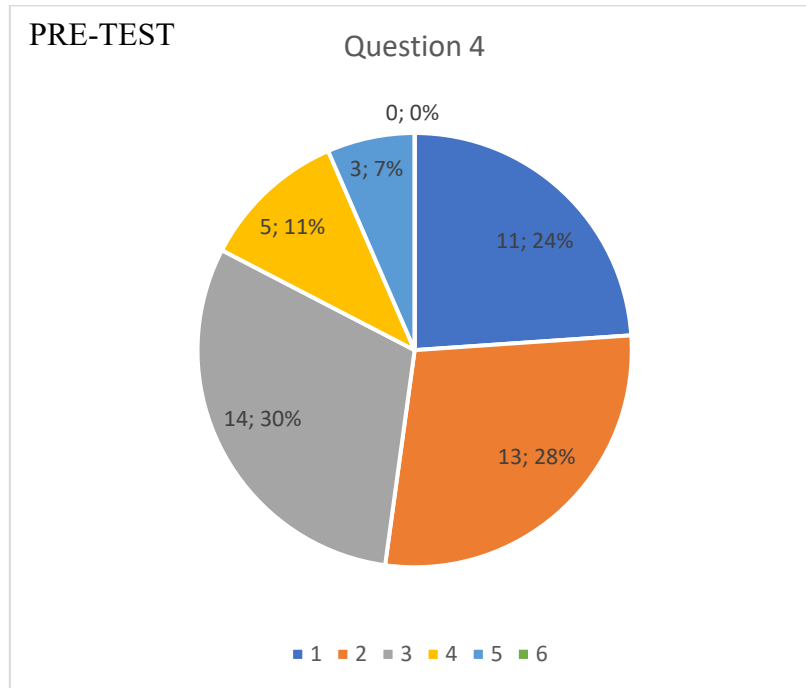
Question 2. (*Question before training*) How would you describe your level of knowledge in relation to PV systems? (1 = Not at all; 5 = Absolutely; 6 = N/A)



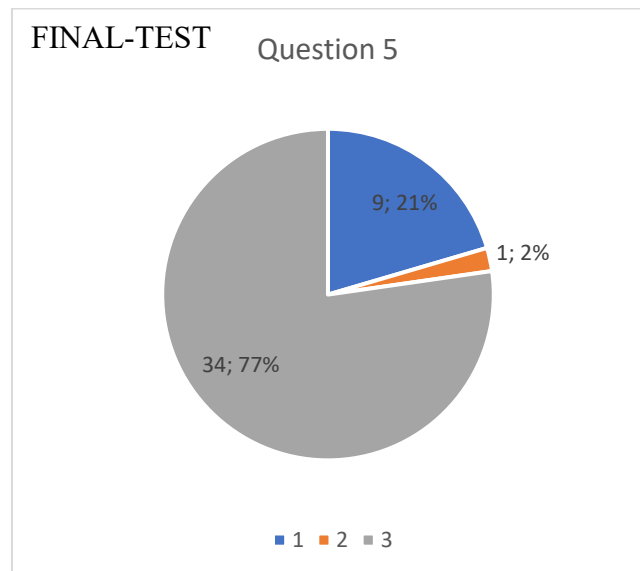
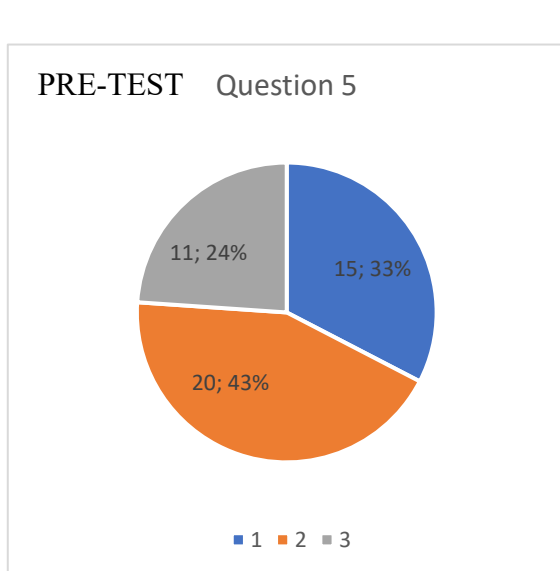
Question 3. (*Question before training*) How would you describe your level of knowledge regarding solar systems? (1= Not at all; 5 = Absolutely; 6 = N/A)



Question 4. (*Question before training*) How would you describe your level of knowledge in relation to PV/T systems? (1= Not at all; 5 = Absolutely; 6 = N/A)

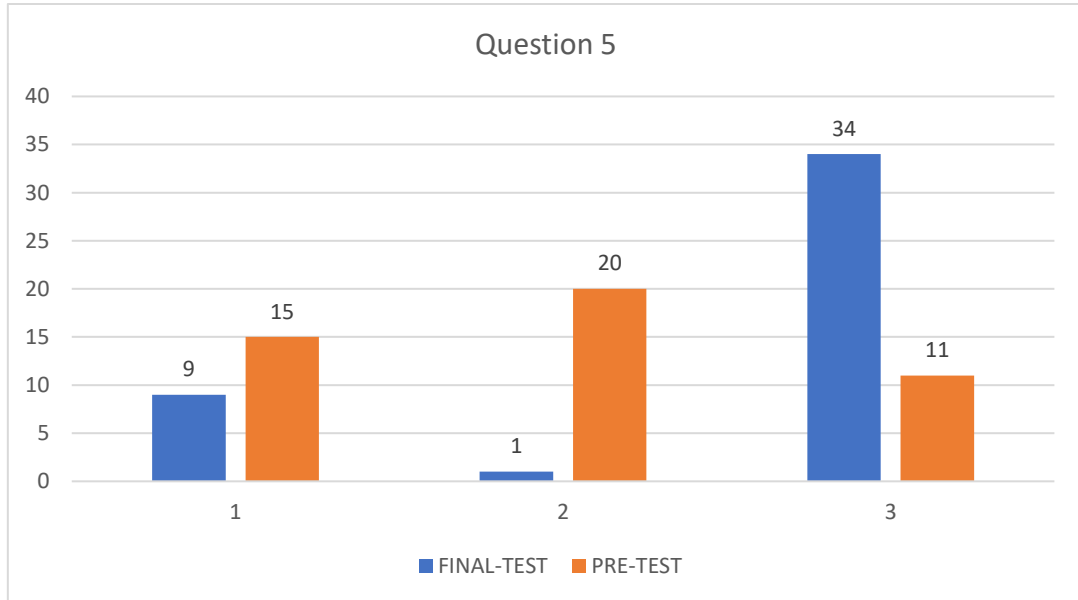


Question 5. (Common question) Evaluate the space and labour required to install PV/T systems compared to individual photovoltaic and thermal system installations. (1 = Greater; 2 = Equal; 3 = Lesser)

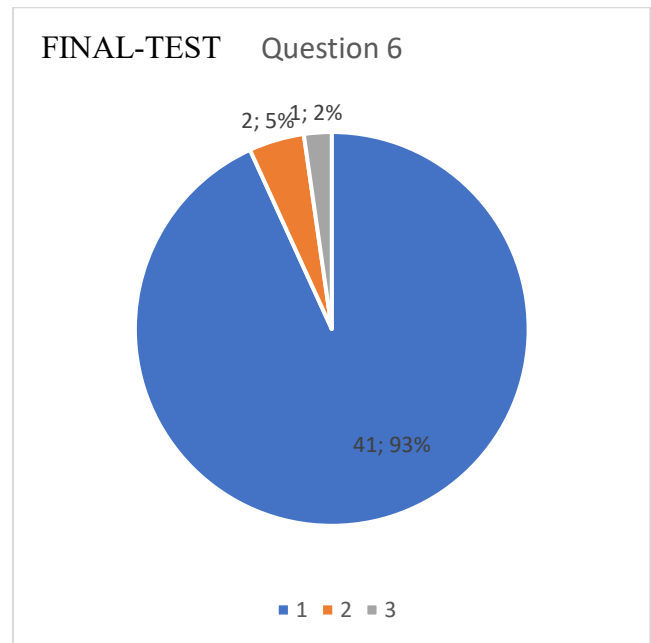
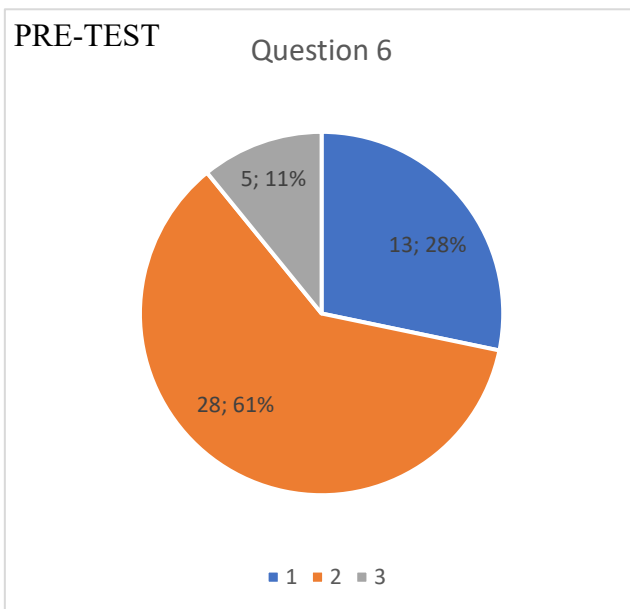


Comparison of the results before and after the training:

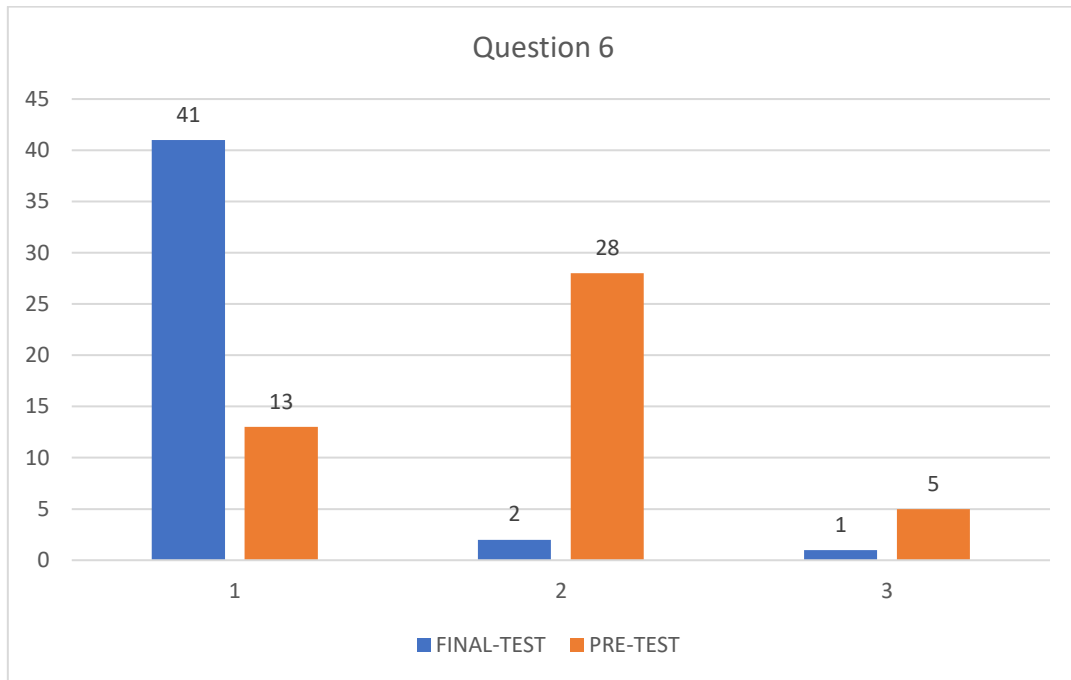
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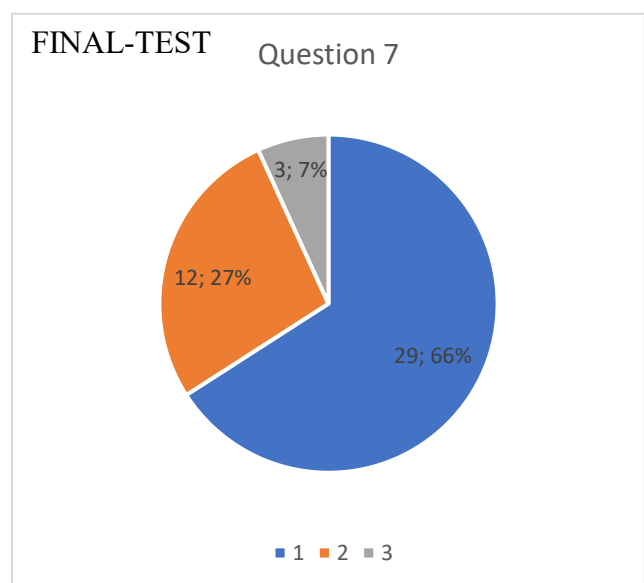
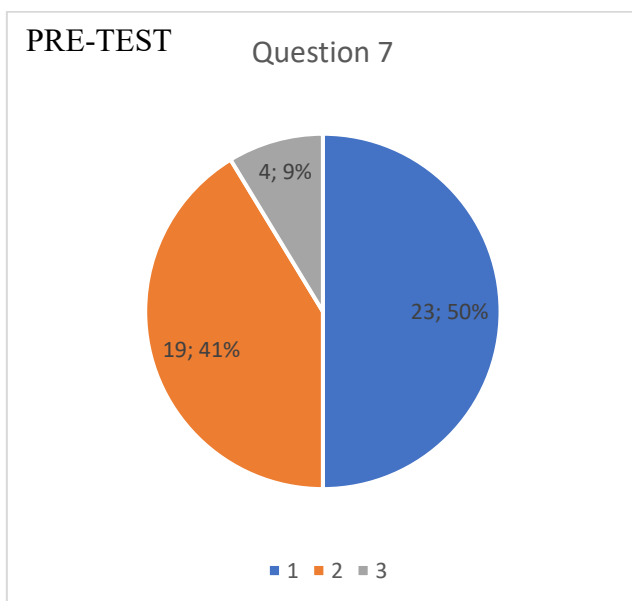
Question 6. (Common question) Evaluate PV/T system installations in terms of aesthetics according to separate PV system and Solar system installations. (1 = Better; 2 = Same; 3 = Worse)



Comparison of the results before and after the training:

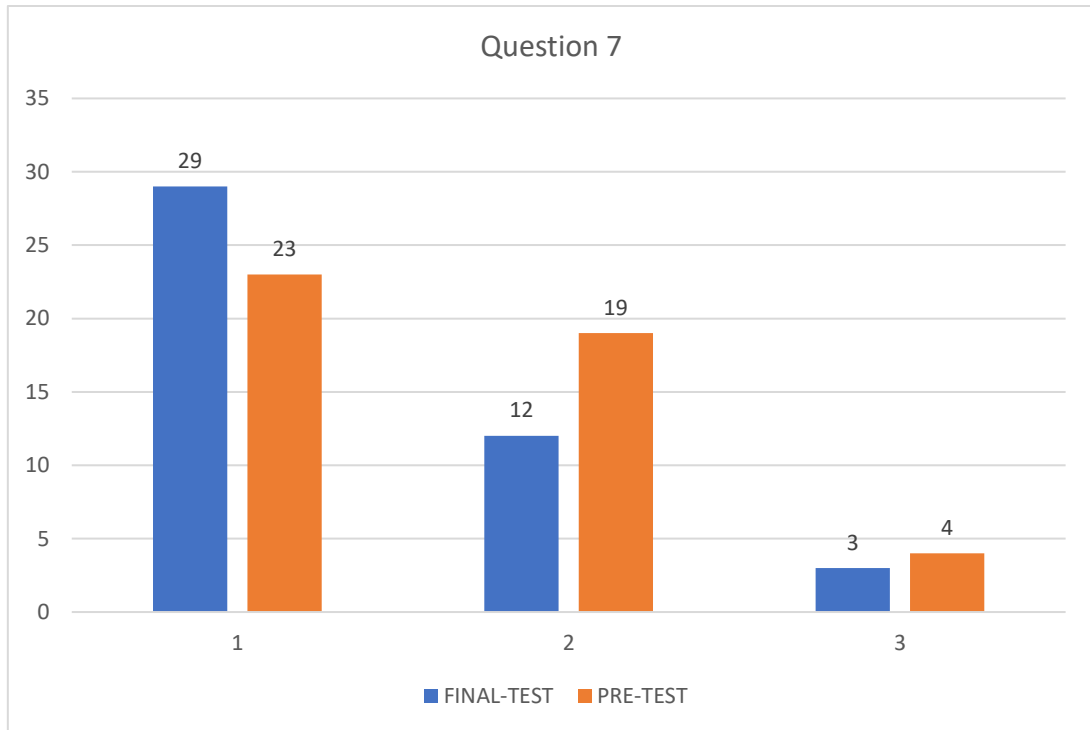


Question 7. (Common question) Evaluate the efficiency of PV/T system installations according to the efficiency of PV system and Solar system installations separately. (1 = Better; 2 = Same; 3 = Worse)

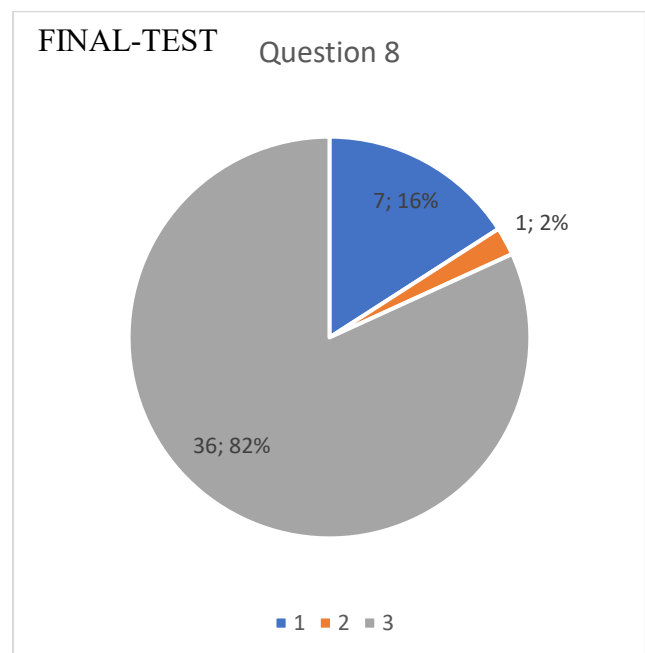
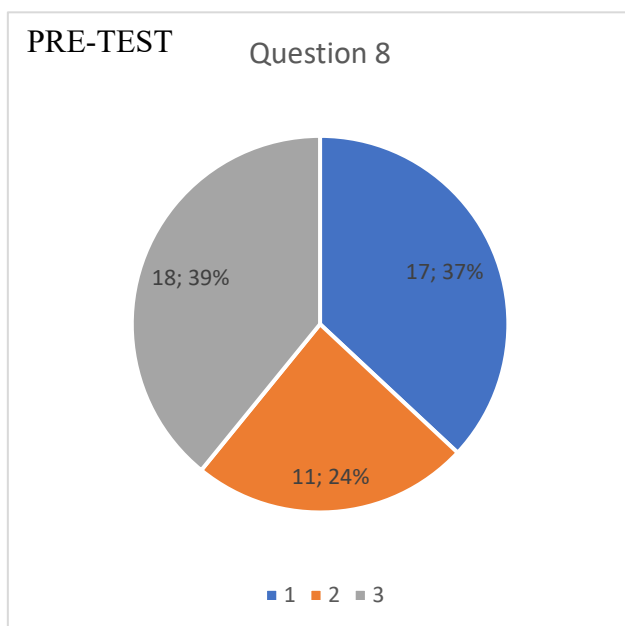


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Comparison of the results before and after the training

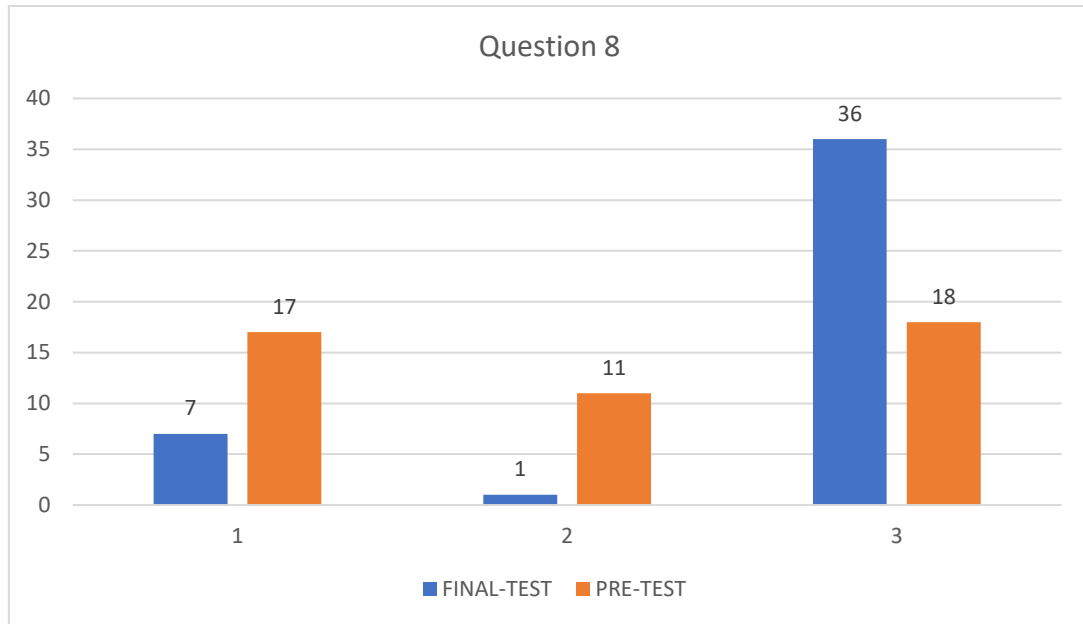


Question 8. (Common question) Evaluate PV/T system installation costs according to the costs of PV system and Solar system installations separately. (1 = Higher; 2 = Same; 3 = Lower)

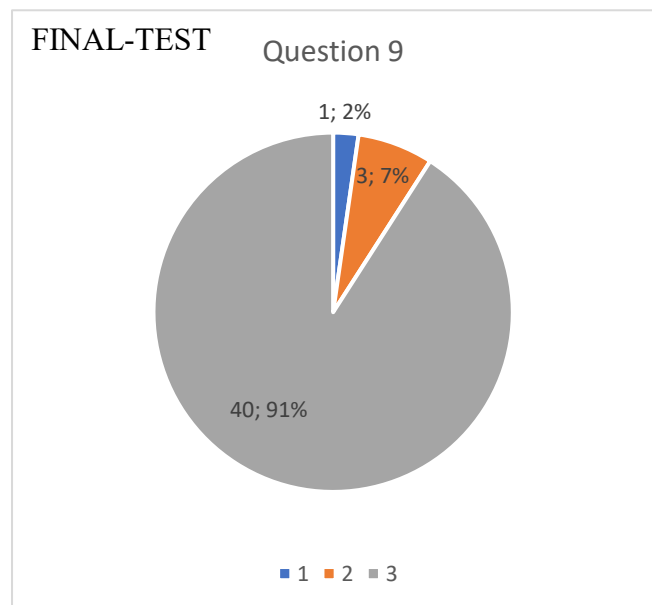
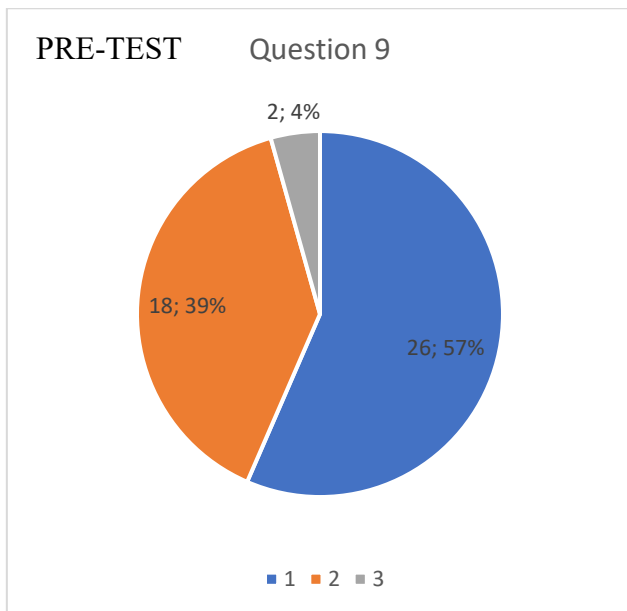


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Comparison of the results before and after the training:

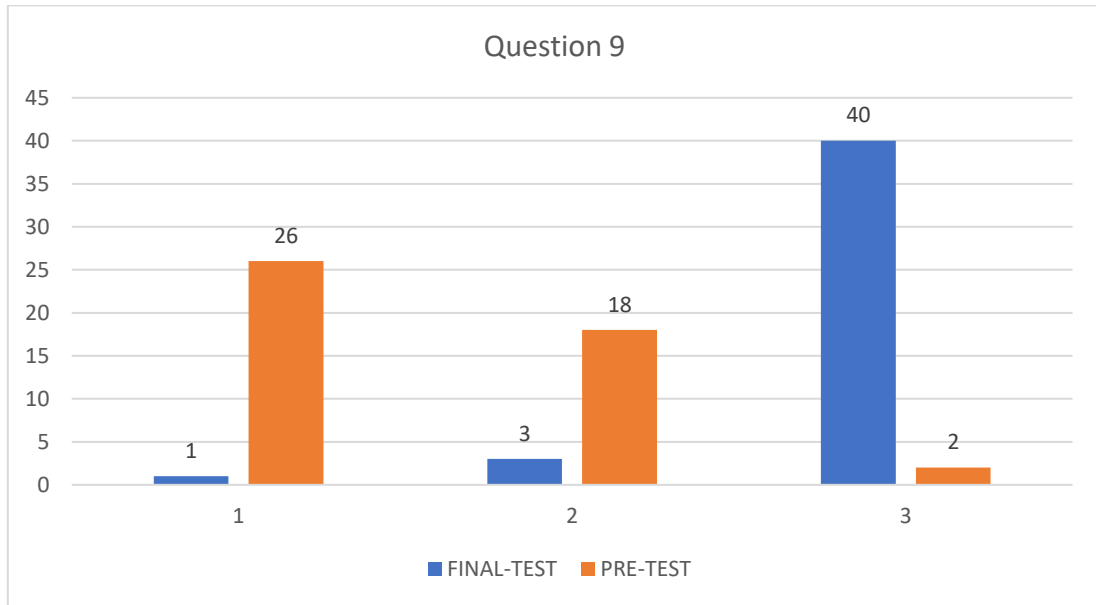


Question 9. (Common question) What are the PV/T system types? (Development question: 1 = Reveals lack of knowledge / Doesn't know; 2 = Reveals some knowledge; 3 = Reveals knowledge)

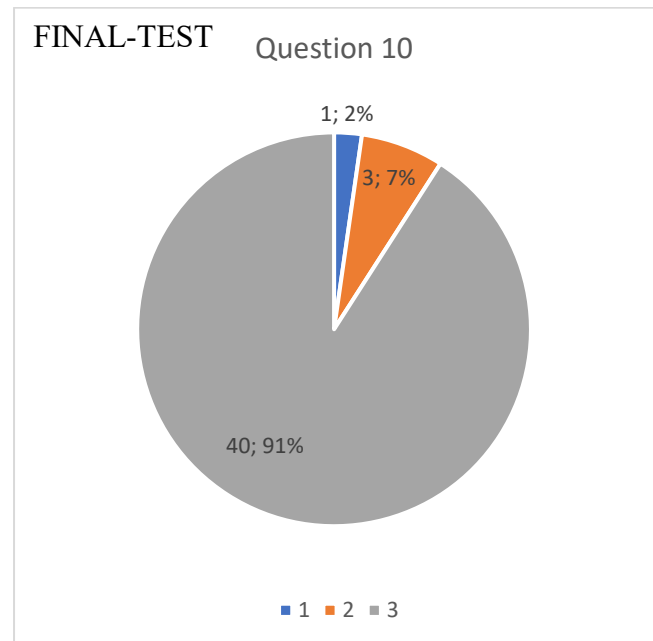
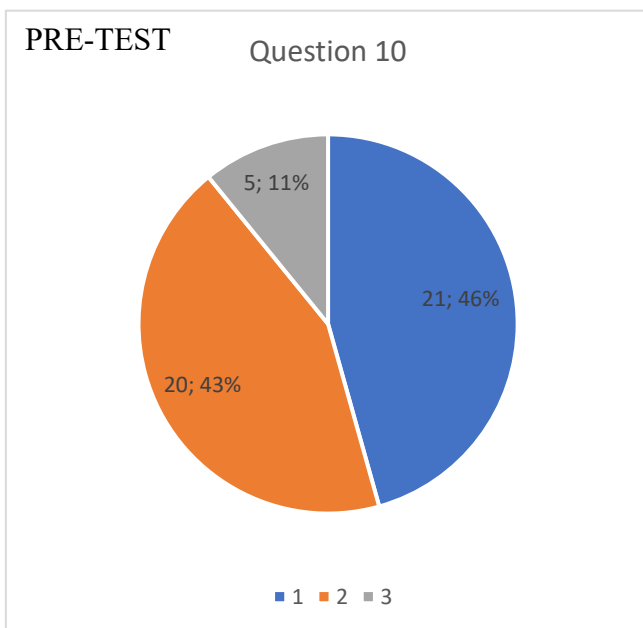


Comparison of the results before and after the training:

PUMH Project (Reference: 2020-1-TR01-KA202-093467)

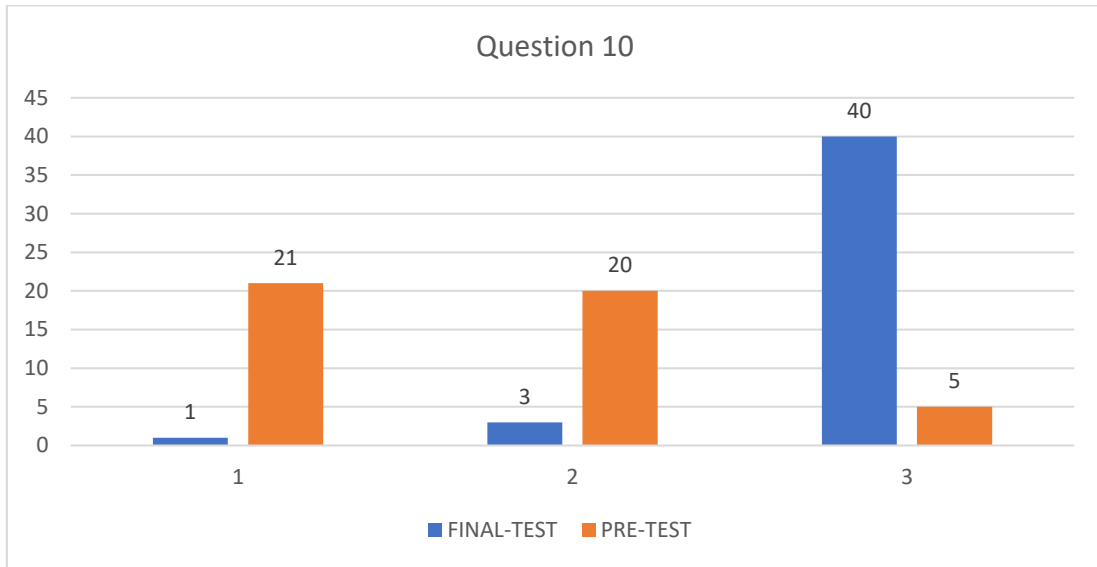


Question 10. (*Common question*) What are the advantages of PV/T systems? (*Development question: 1 = Reveals lack of knowledge / Doesn't know; 2 = Reveals some knowledge; 3 = Reveals knowledge*)

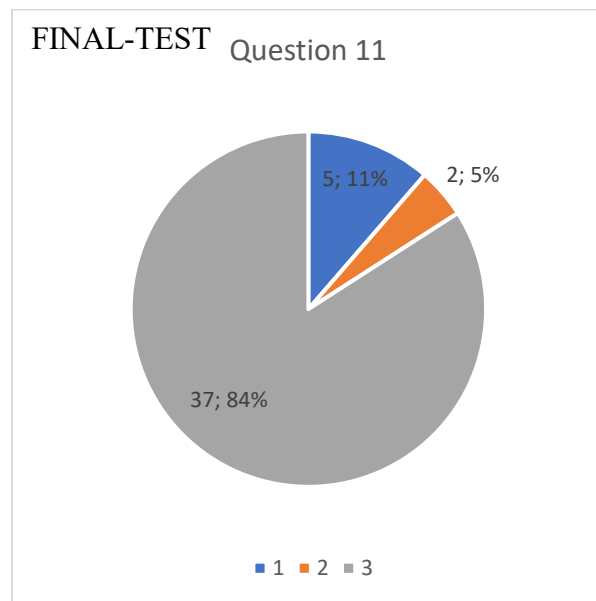
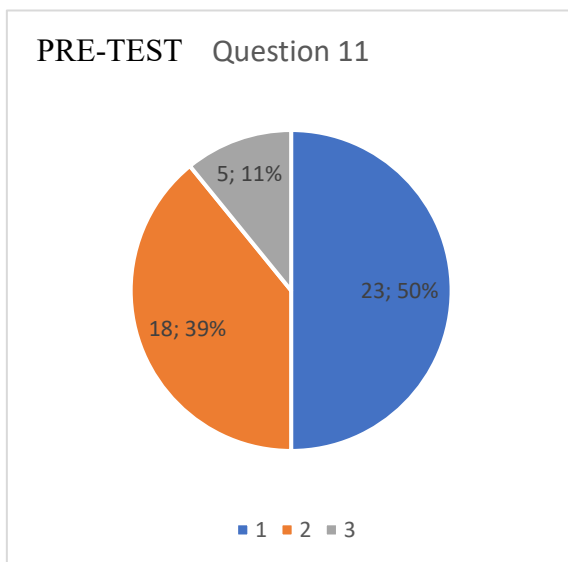


Comparison of the results before and after the training:

PUMH Project (Reference: 2020-1-TR01-KA202-093467)

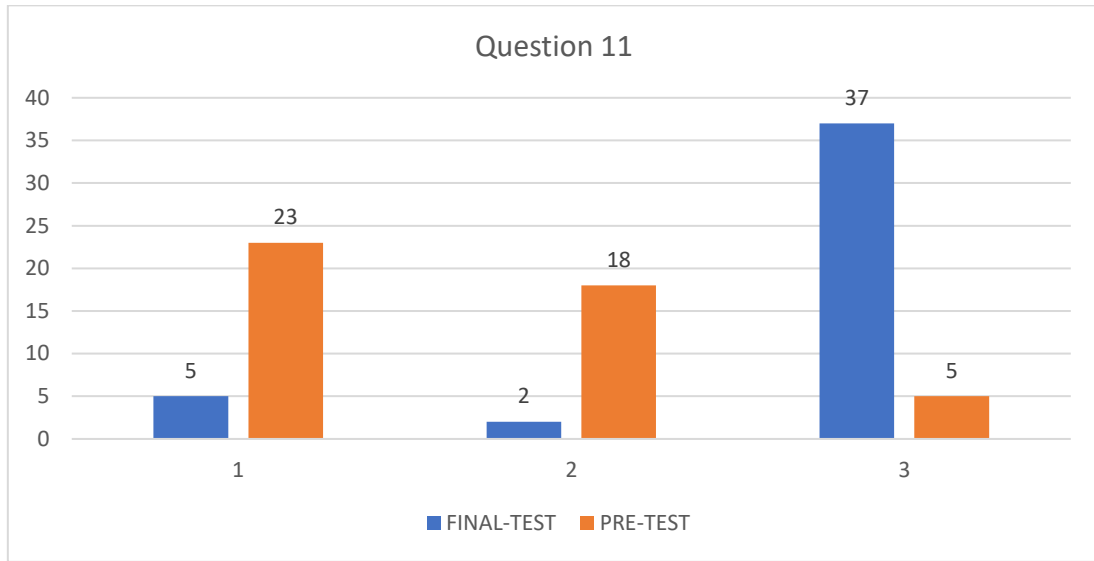


Question 11. (*Common question*) What are the disadvantages of PV/T systems? (*Development question: 1 = Reveals lack of knowledge / Doesn't know; 2 = Reveals some knowledge; 3 = Reveals knowledge*)

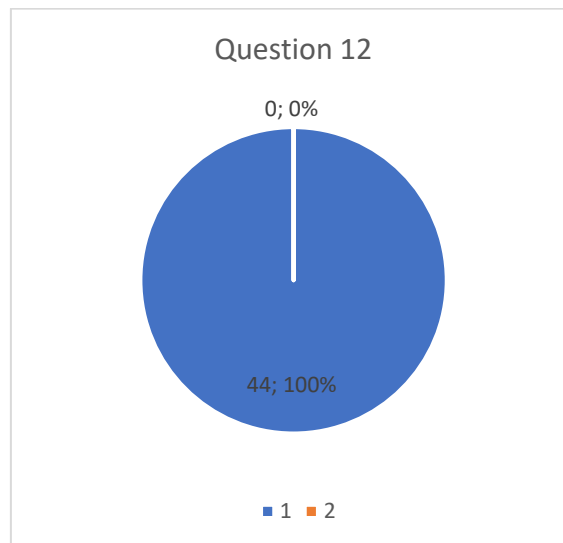


Comparison of the results before and after the training:

PUMH Project (Reference: 2020-1-TR01-KA202-093467)

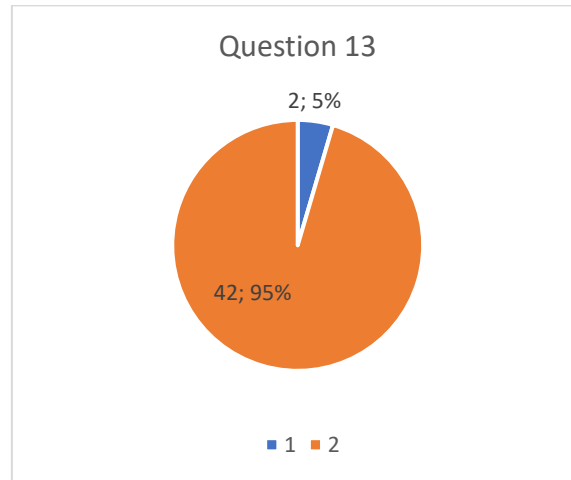


Question 12. (*Question after training*) The cell voltages increase when solar cells are connected in series. (1 = True; 2 = False)

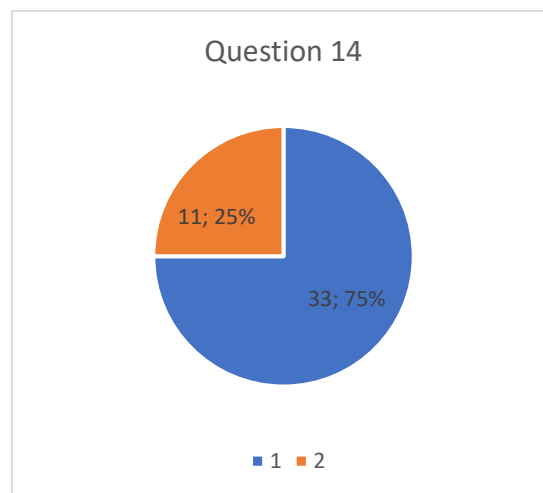


Question 13. (*Question after training*) When solar cells are connected in parallel, the cell current decreases. (1 = True; 2 = False)

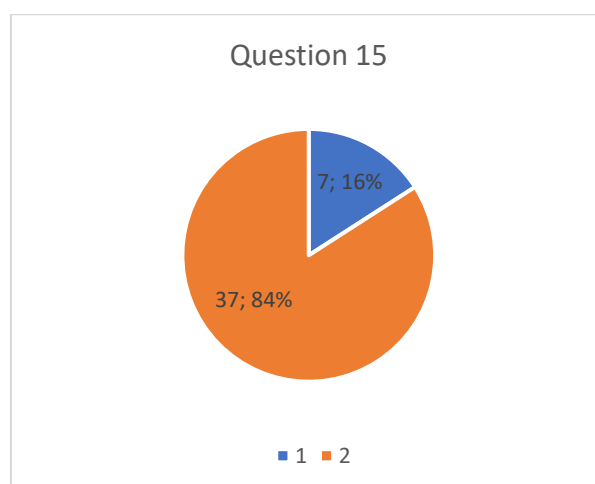
PUMH Project (Reference: 2020-1-TR01-KA202-093467)



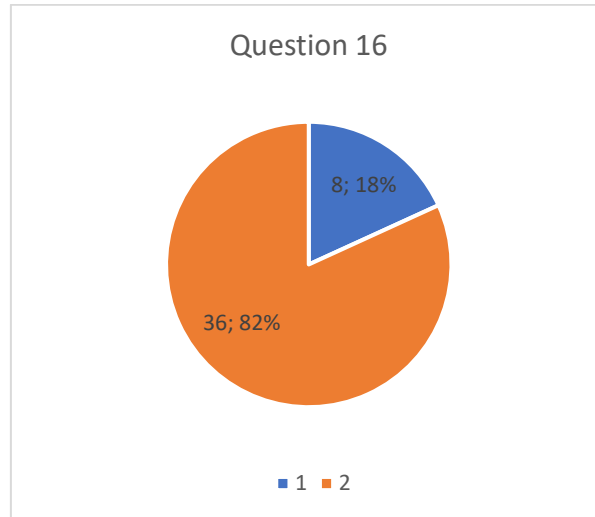
Question 14. (*Question after training*) Each solar cell supplies approximately 0.5 Volts. (1 = True; 2 = False)



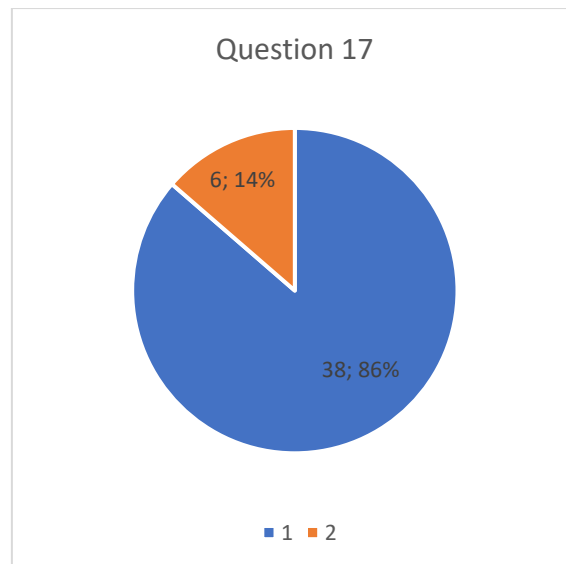
Question 15. (*Question after training*) As the incident solar radiation increases, the voltage of the photovoltaic module decreases. (1 = True; 2 = False)



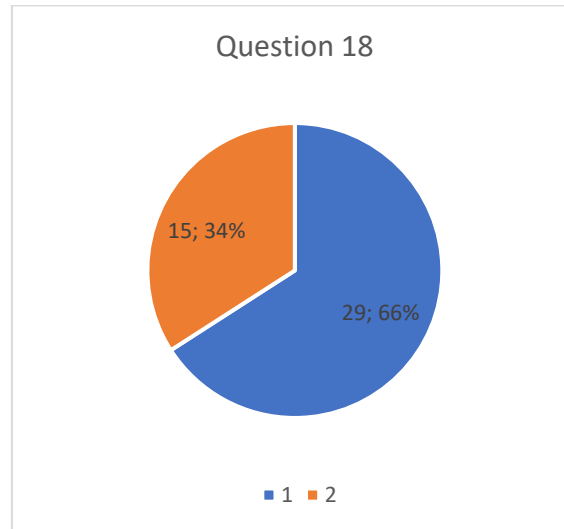
Question 16. (*Question after training*) As the temperature increases, the voltage of the photovoltaic module increases. (1 = True; 2 = False)



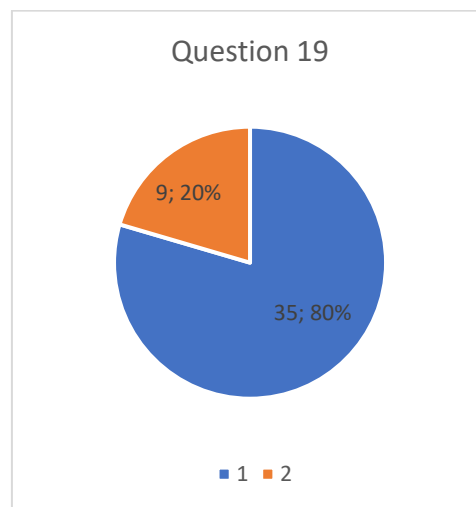
Question 17. (*Question after training*) As the temperature increases, the PV module current increases. (1 = True; 2 = False)



Question 18. (*Question after training*) Efficiency is the ratio of power received to power delivered. (1 = True; 2 = False - As it is presented, the question proved to be tricky)



Question 19. (*Question after training*) To get the maximum power from the solar cell, the sun's rays must strike the solar cell at a right angle. (*1 = True; 2 = False*)



Conclusion

Several students rate themselves as well versed in ICP technology (Question 1). Students in the technological education areas have some kind of subjects that deal with renewable energy throughout their course, so their knowledge is as expected. However, Question 4, about PV/T systems, showed that most of the students didn't know this technology before the training.

After the training, the level knowledge of the students improved significantly.