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Comparison of carbon dioxide emissions produced between paper-based and computer-based for demonstration indirect light concepts

The quality of education is one of the UN sustainable development goals. Nowadays, greenhouse gas emissions have escalated to record levels and there are concerns in urgently finding sustainable methods to reduce carbon to avoid climate change and to reduce greenhouse gas emissions (GHGe). Studying in SLR lab, indirect lighting demonstration is one of the important topics where paper is required to conduct the demonstration experiment using worksheets and exam paper which will be disposed of every semester. To take the current global warming situation into account, the demonstration of indirect lighting has been changed to entirely use computer-based (paperless) demonstration. In this research, we compare the amount of carbon dioxide emitted from the paper-based demonstration and computer-based demonstration in the form cradle-to-gate. We collect the data from SLR lab from two semesters then report the carbon footprint calculation to compare the results. Also, the assignment is given to the students to assess and compare their understanding. The results indicate that the GHGe of the average paper-based and paperless are 0.76 kg and 0.06 carbon dioxide equivalents (CO2-e) per person respectively which shows that it can be reduced up to 0.70 kg per person. For the assignment results by comparing the students understanding, we found that the average scores from the written part and practical part are not different. In conclusion, we can reduce the use of paper demonstration and fully convert to computer-based demonstration. Moreover, reducing the use of paper can help to reduce global warming situation. Also, these data will enable comparisons between changes in dietary intake and GHGe over time, as well as provide a reference point for developing the quality of education.

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