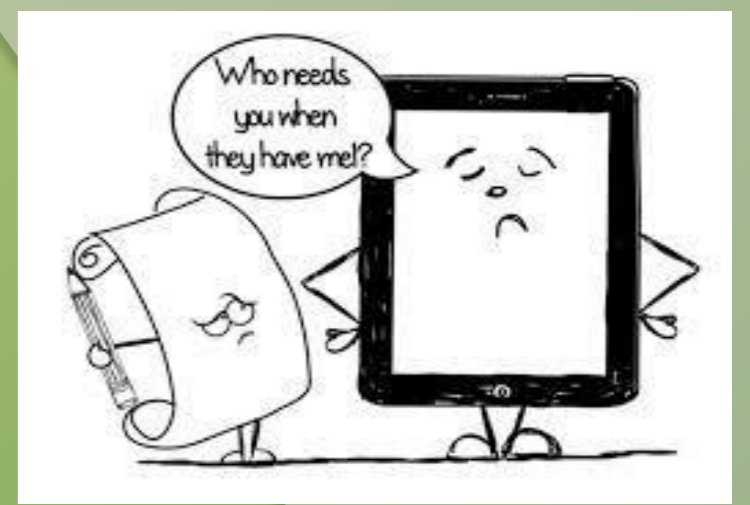




The Digital Debate

Is the Future of Tertiary Education in the Past?



1. Abstract

Tertiary education seems to be moving towards electronic learning. Is this shift environmentally justifiable? This study investigates the environmental impact of a shift from using paper to using a “tablet” system for dissemination of information to students at the University of the Witwatersrand. Results indicate that the use of paper is more environmentally friendly than the use of electronic learning - even more so when alternative ways of recycling paper are considered.

2. Introduction

The purpose of this study is to determine the environmental impact of using paper in studies as compared to the impact of an electronic tablet for the same function. In doing so, Life Cycle Analysis (LCA) shall be employed as a tool to assess the environmental impact of each product over its entire lifetime. It must be noted however, that whilst the environmental impact of a product affects the extent to which it will be adopted, the ultimate deciding factor is that of public preference.

3. Life Cycle Analysis

The LCA concludes that a tablet results in CO₂ e emissions of 130kg per unit from cradle to grave. Only 20% of components can be recycled.

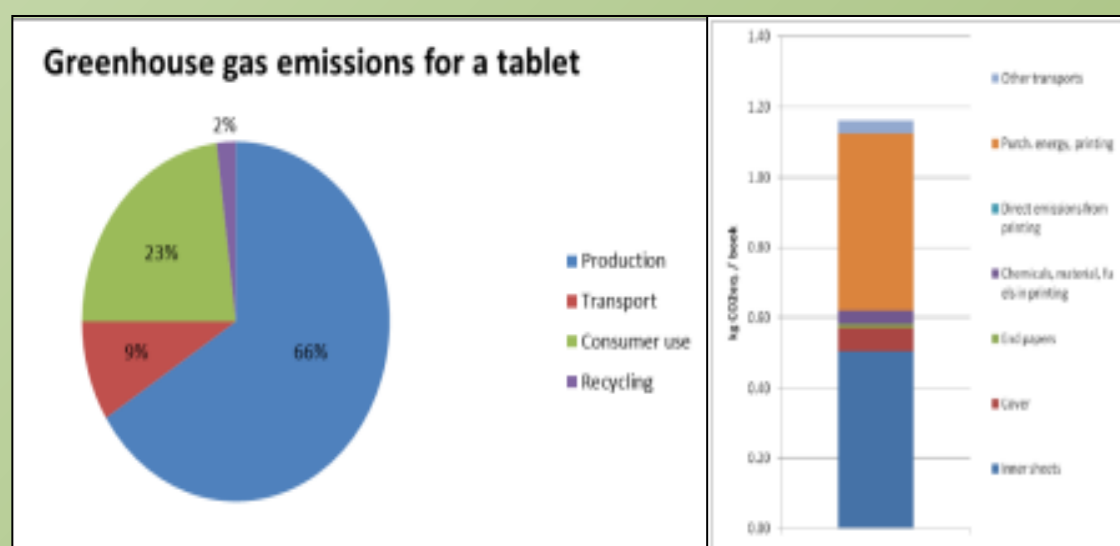


Figure 1: LCA Comparison for Tablet and Paper

The Paper Industry plants 600 million trees annually, of which only one third is harvested.

The carbon footprint of one hardcover book is 1.15kg CO₂ e. This book will continue to absorb CO₂ from the atmosphere for the duration of its lifetime – resulting in a net positive effect.

91.5% of water used in paper production is returned to the watershed.

38% of energy used is renewable and is a by-product of paper-manufacturing

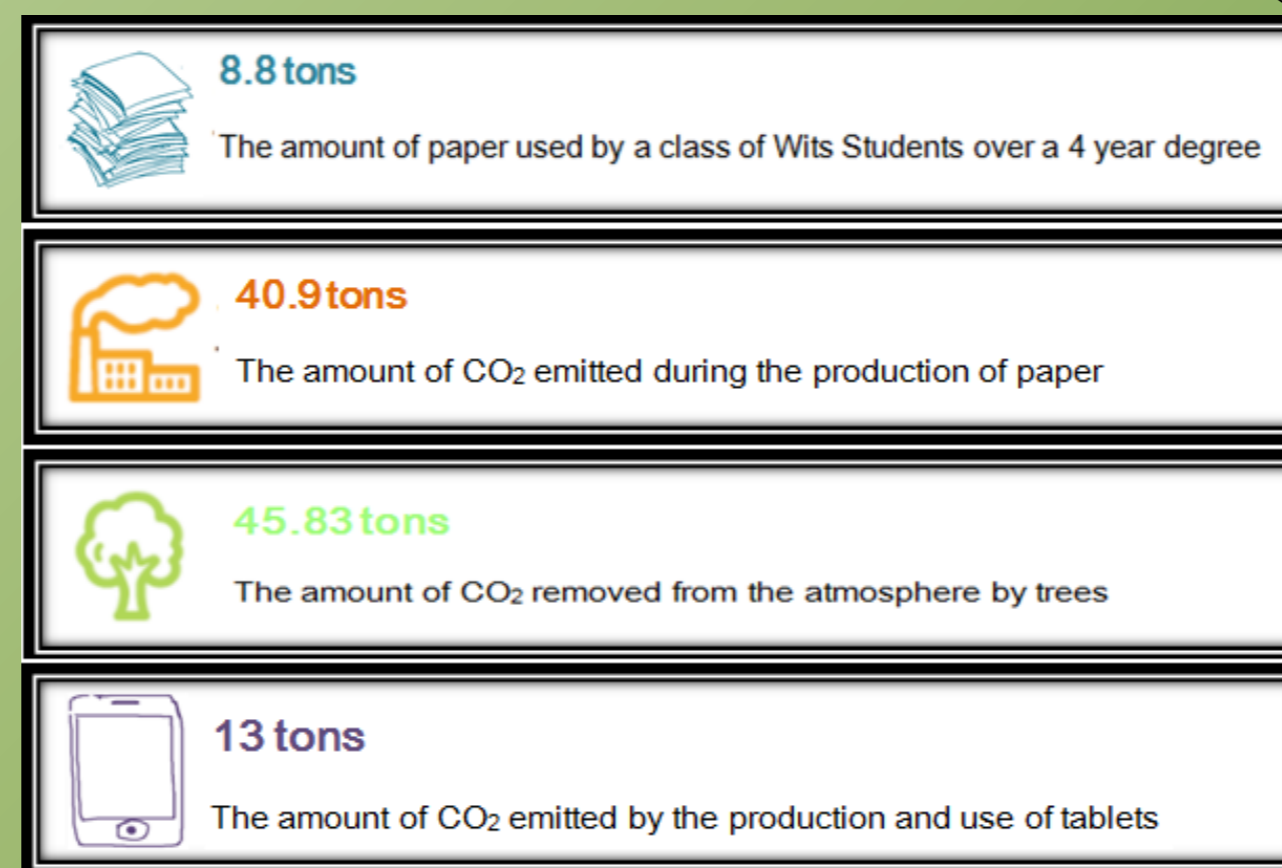
Paper is renewable and recyclable.

Paper is a carbon positive industry when considered from cradle to grave.

4. Case Study

Google emits 96.5 tonnes of CO₂ every day from searches

Fast Facts*:



*Considers a Chemical Engineering class of 100 students over 4 years

Paper thus has a net positive effect on the environment of 4.93 tons CO₂

Comparing the two, it is immediately evident that the use of tablets is detrimental to the environment whilst the use of paper favours positive environmental growth.

Of the 50% of students who know that Paper is better for the environment, 40% would rather use a tablet.

5. Waste to Energy



- Only 25% of students actively recycle their notes
- Approximately 60% of paper goes to landfill sites creating harmful methane.
- Methane (natural gas) can be used as a fuel if captured from landfill sites
- South Africa has developed a method to do this on a landfill in Durban
- This process can add up to 830 GWh of energy to the grid resulting in a total reduction of 2758550 Tons of CO₂ emissions per year.
- Another option is the use of bacteria to “eat/digest” the paper to produce a fuel.
- This strain of bacteria called the T-103 ,produces a n-butanol biofuel directly from the cellulose in paper.
- The n-butanol actually contains more energy than ethanol (traditional 1st generation biofuels) and is compatible in current motors as source for liquid fuels.

We recommend that the University explore these methods of waste recovery and actively encourage students to recycle by means of incentive-based programmes. This could go a long way in ensuring decreased emissions and a greener environment

6. Conclusion

As found by this investigation, Tertiary education should not be adopting the e-learning system, but rather research into improving ways for recycling and reducing landfill waste. Further research into the feasibility of such actions is necessary before any action can be taken.



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