

## How much is your time really worth? Student paper evaluates the economics of thought

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Image by Sam Rohn, flickr.com/photos/nylocations/

Big thinkers may wish to re-evaluate their rates, according to a student study at the University of Leicester, which tested the popular idiom 'A penny for your thoughts' by working out how much of a person's thought could theoretically be purchased with a single penny.

The study suggests that a penny could, in theory, purchase 3 hours, 7 minutes and 30 seconds of thought according to Natural Sciences student Osarenkhoe Uwuigbe from the University of Leicester's Centre for Interdisciplinary Science.

In a paper published in the *Journal of Interdisciplinary Science Topics*, a peer-reviewed student journal run by the University of Leicester's Centre for Interdisciplinary Science, the student first investigated how much <u>power</u> is needed to produce thought.



For simplicity, the study examined the power necessary for the brain – which consumes roughly 20 per cent of the body's energy - to run as being the power necessary for the production of thought.

Given that the average <u>power consumption</u> of a typical adult is approximately 100 watts, the student calculated that the power necessary to run a human brain and produce thought is roughly 20 per cent of this – or 20 watts.

To apply monetary value to thought, the price per kilowatt hour (kWh) charged by UK energy companies was calculated, settling on 16 pence per kWh, which is within the range of prices typically charged by UK energy companies.

Assuming that it requires 20 W or 1/50 kW to produce thought, charging 16p per kWh means that one penny can purchase 1/16th of a kWh. Therefore the length of time (in hours) a penny can purchase thought for is  $(1/16) \div (1/50) = 3.125$ .

Assuming that it is possible to think as fast as you can speak, the student suggests that 3 hours, 7 minutes and 30 seconds of thought and speech can be bought with a penny.

Student Osarenkhoe Uwuigbe said: "This model is likely to be an underestimate as power required for the brain to operate does not necessarily translate to power used in thought. The brain has several autonomic functions it carries out during thought processing and as a result <u>thought</u> processing could not take 100% of the power consumption of the brain.

"Furthermore, it is unlikely that it is possible to think as fast as you speak due to delay caused by biological constrains such as conduction velocity of nerves carrying the signal from the brain to the mouth, the



release of Ca2+ ions during muscle contraction of the tongue and lips and so on."

Dr Cheryl Hurkett from the University of Leicester's Centre for Interdisciplinary Science said: "An important part of being a professional scientist (as well as many other professions) is the ability to make connections between the vast quantity of information students have at their command, and being able to utilise the knowledge and techniques they have previously mastered in a new or novel context.

"The Interdisciplinary Research Journal module models this process, and gives students an opportunity to practise this way of thinking. The intention of this module is to allow students to experience what it's like to be at the cutting edge of scientific research.

"The course is engaging to students and the publishing process provides them with an invaluable insight into academic publishing. It also helps students feel more confident when submitting future papers. I find it a very rewarding module to teach and I am always pleased to see my students engaging so enthusiastically with the subject. I encourage them to be as creative as possible with their subject choices as long as they can back it up with hard scientific facts, theories and calculations!"

**More information:** The full student paper 'A Penny For Your Thoughts' is available here: <u>physics.le.ac.uk/jist/index.ph</u>..../article/view/113/75

Provided by University of Leicester

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