Comparison of Brain Waves, Blinking, and Reading Comprehension When Reading on an Electronic Device and a Printed Text

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Technology dependency is increasing; estimations say 97% of Americans own a smartphone (Pew Research 2024); therefore, it is important to know how it affects society. This project aimed to discover if reading on an electronic device affects brain waves, blinking, and reading comprehension differently than reading a printed text. To conduct this project, 15 teenage females and 15 teenage males were tested using a device to record their brain waves while reading two texts, one for each method, and after answering a validated test, to compare reading comprehension. Later, this process was repeated, but to record participants' blinking. T-tests were performed to analyze the data. The blinking data test showed a significant difference ($p = 0.009$), while reading comprehension showed insignificant difference ($p = 0.865$), but observations showed a possible difference. A specific participant was consistent, scoring 3/3 on an electronic device and 2/3 on printed text, while another scored 3/3 on printed text and 1/3 on an electronic device. This showed better reading comprehension on printed text because the results were consistent in comparison to electronic devices. A minute of brain waves was analyzed and divided into 15, 30, 45, and 60 seconds. The t-tests of the data for 15, 30, and 45 seconds showed a definite insignificant difference, but the 60-second data was slightly above ($p = 0.053$). Other observations showed that when reading a printed text, waves fluctuate from beta to gamma, but on an electronic device, they are consistently gamma waves.

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