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## Modeling brain activities during reading working memory task : Comparison between reciting Quran and reading book

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### Abstract

Muslim believe that each Islam practice has its advantages and benefits in many different ways. This paper discussed an analysis of Electroencephalogram (EEG) signal of the resting state and calming mind during reading (reciting) Quran. The data collection of this study involves four different conditions, which are before reciting the Quran, before reading a book, during reciting the Quran and during reading a book thus establishing the comparison between reading a book and reciting the Quran, and also the relationship between each parietal cortex value for each condition. Reading book acts as a controller for reciting Quran because both conditions use the same action (read). Ten healthy subjects were recruited to measure their behaviors of mind during reciting Quran and reading book by using EEG wave. The results showed the negative correlation between reading book and reciting Quran for each subject. Moreover, the Quran could become a tool for meditation, reduces stress and be in resting state (calming mind). The results hopefully can help people to recognize the advantages and the need of Islam's practice in human life.

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### 1. Introduction

Meditation is termed for practices don for the purpose of self-transformation and it is as part of a religious tradition [1-3]. There are many specific ways of meditating; even in a specific religious tradition there are lots of different ways of meditating. Buddhist, Christian, Jews, Hindus and Islam also state the meditation practice in their religion.

In Islam, a Muslim is obliged to pray at least five times a day. During prayer, Muslim focuses and meditates to God by reciting the Quran and engaging in *dhikr* to reaffirm and strengthen the bond between Creator and creation [1]. Such meditation is intended to help maintain a feeling of spiritual peace, in the face of whatever challenges work, social or family life may present.

The Quran is not like other books whose sources may be unknown and whose translations and meanings are doubtful. All three principles of truth, virtue and beauty are conveyed in the essence of the Almighty, His Prophet, and through the Noble Book. Since this is the case, it becomes clear that these three principles should also be woven through the events of our everyday lives as they complement each other. Allah S.W.T stated in Quran, Surah Az

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Zumar, verse 23 which is: "Allah has revealed the best of revelations, a book consistent with itself, repeating its teachings in various aspects. The skins of those who fear their Lord shiver at it, then their skins and hearts soften to the celebration of praising Allah."

For this study, the Quran meditation can be measured by using Electroencephalogram (EEG), which is a device used for capturing brainwave signal. Brain is made up of billions of neurons, which each brain area represent different task and have their own roles [4 - 5] while EEG is the measurement of electrical activity produced by the brain as recorded from electrodes placed on the scalp. The EEG scalp is collected from electrodes positioned on 10-20 electrodes standard placement at the surface of the head (See Figure 1 (a) ). EEG signals (in the range of mV) are amplified and digitalized for later processing [ 6 -7].

The EEG is typically described in terms of rhythmic activity. The rhythmic activity is divided into bands by frequency. EEG frequency bands are normally classified into five categories such as alpha, beta, gamma, delta and theta. Alpha Wave is the one concern on a relaxation and resting state [8] and this type of band (Alpha Band) have been main focus on this study.

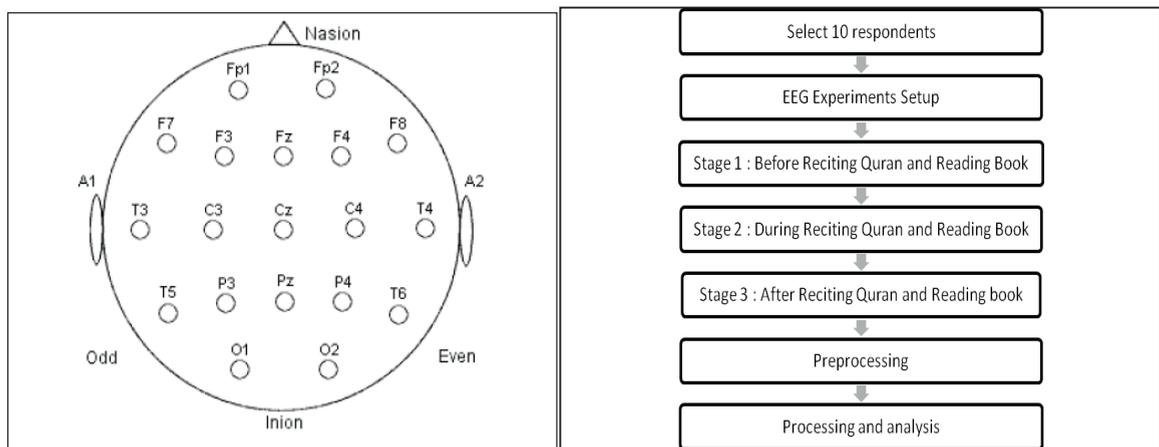


Fig 1 : (a) Diagram of 10-20 electrodes standard placement of EEG ; (b) Methodology of the experiment

## 2. Methodology

To acquire the measurement of EEG brainwave, a system is composed and divided into five parts. Firstly, the respondents for this study have been selected. Secondly is the data collection part ; each subject undergo the EEG experiment for both reciting quran and reading books (signal data taken) . Then, the EEG raw data is converted into ASCII format. Next, data analysis is done by filtering the artefact. Finally, the filtered data is analyzed by using Fast Fourier Transform (FFT) algorithm and then do the comparison between every task – a) before recite Quran, b) during recite Quran, c) after recite Quran, d) before reading book, e) during reading book, f) after reading book.

Figure 1 (b) shows the process flow of the experiment,

### A. Respondents Selection

The data corresponds of 10 healthy subjects, which they were all free from cardiac, pulmonary, metabolic and other disease that would cause autonomic nervous system dysfunction. The subjects were 10 males, right handed and the range of age is between 22- 24 years old.

### B. Data Collection Using EEG Machine

The signals were taken three times for each subject per task, which are before reciting the Quran and reading the book, during reciting the Quran and during reading the book. There was a time interval between each recording. At first, the respondents will start to recite the Quran or read the book, after 3 minutes of stabilization; the signal will

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