



University Research Grant Final Report

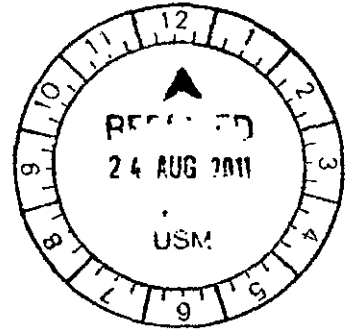
(Final Revision July 2011)

Title:

Neurofeedback and Mental Health:
An Integrative Research Agenda

Prepared by:

Dr Zainal Ariffin Ahmad



Tarikh: 24 Ogos 2011

Kepada: Profesor Dr. Nor Hayati Othman
Dekan
Profesor Penyelidikan Sains Klinikal dan
Pelantar Penyelidikan klinikal
Universiti Sains Malaysia

Y.Bhg Prof,

**PINDAAN LAPORAN AKHIR DAN LAPORAN TEKNIKAL BAGI GERAN BERTAJUK
"NEUROFEEDBACK AND MENTAL HEALTH: AN INTEGRATIVE RESEARCH AGENDA"**

Dengan segala hormatnya, perkara di atas adalah dirujuk.

Untuk pengetahuan Y.Bhg Prof, Dr. Zainal Ariffin Ahmad telah membuat pindaan terakhir kepada laporan akhir geran beliau seperti yang telah dicadangkan oleh pihak Y.Bhg Prof pada Julai yang lalu. Oleh itu, saya lampirkan laporan akhir dan juga laporan teknikal yang telah dipinda. Bagi memudahkan pihak Y.Bhg Prof mengenal pasti pindaan pada laporan tersebut, pihak saya telah menandakan dengan warna kuning bagi setiap perubahan ke atas laporan tersebut.

Sehubungan dengan itu, saya berharap agar pihak Y.Bhg Prof dapat meneliti laporan tersebut dan kerjasama daripada pihak Y.Bhg Prof saya dahului dengan ucapan ribuan terima kasih.

Sekian, terima kasih.

"Memastikan Kelestarian Hari Esok"

PROF. DR. JAFRI MALIN ABDULLAH

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**UNIVERSITY RESEARCH GRANT FINAL
REPORT (Final Revision July 2011) *Geran
Penyelidikan Universiti
Laporan Akhir (Kemaskini Julai 2011)***

A. TITLE OF RESEARCH: Neurofeedback and Mental Health: An Integrative Research Agenda
Tajuk penyelidikan:

AMENDED REPORT per letter from Professor Dr Nor Hayati Othman (20/06/2011):

E. Additional information

1a. Title and promise of EEG use for new feedback – **Answer:** supports provided as what were actually achieved – literature review, poster, and the unpublished articles – we can't make up what we did not do. We didn't proceed as the PhD researches were dropped and the PhD candidates reverted back to the psychological aspects of their study. We strongly felt that the neuroscience aspect provided better understanding of the phenomena or learning and decision making.

1b. Technical reports and chain of events were not adequately addressed in terms of valid technical reasoning. **Answer:** These were addressed in the description of the process of rectifying the problems via emails back and forth with EGI and the actions taken to rectify up to the point the EEG machine had to be returned to HUSM. The decision for the "failed" PhD studies were decided by their respective schools to remove the experiments from the candidates' research. The candidates had attempted to carry out the experiments and follow what they were trained on the EEG.

2. MHF Training - is not research per se as it was to train the MHF. **Answer:** The first objective was "how to assess the state of mental health and assist individuals in dealing with mental issues as a primary intervention". The research component was based on the literature review and research on mental health and NBCCI had provided the training for addressing this objective.

3. Noted - we will include in section H (a) Human Capital development, part (f) other - 49 MHF.

4. Chapter 2 - noted. The second objective of this research was "to establish the protocol, process and procedures for conducting EEG and neurofeedback research for non-medical researchers." As far as we are concerned, we have learned how to establish the protocol, process, and procedure for using the EEG in business/education research. Yes, we may lack of technical skills but we have a neuroscientist in our who helped us to better understand the neuroscience behind what we were doing. We tried our best given the problem with the equipment.

AMENDED REPORT per letter from Professor Dr Nor Hayati Othman (10/04/2011):

- a) Synopsis of the study including the exact methodology and results
- b) Abstracts of the 2 experiments – included in the
- c) Copies of published manuscripts with/and papers presented (Appendix A).
- d) Comprehensive technical report (item G) - attached
- e) Itemized & accounting expenditure (this is with HUSM Bursary – See Appendix B)

B.	PERSONAL PARTICULARS OF RESEARCHER / MAKLUMAT PENYELIDIK:
(i)	Name of Research Leader: Associate Professor Zainal Ariffin Ahmad, Graduate School of Business <i>Nama Ketua Penyelidik:</i>
	Name of Co-Researcher Professor Susie See Ching Mey, School of Educational Studies <i>Nama Penyelidik Bersama:</i> Professor Jafri Malin Abdullah, School of Medical Sciences Azura Abdul Halim, RO, Graduate School of Business Rapida Saimi, RO, School of Management Adel Tajasom, PhD Candidate, School of Management Ali AIGHafri, PhD Candidate, School of Educational Studies
(ii)	School/Institute/Centre/Unit : Pengurusan/Siswazah Perniagaan <i>Pusat Pengajian /Institut/Pusat/Unit :</i>

C.	Research Platform (Please tick (/) the appropriate box): <i>Pelantar Penyelidikan (Sila tanda (/) kotak berkenaan):</i>
	<input type="checkbox"/> A. Life Sciences <i>Sains Hayat</i>
	<input type="checkbox"/> B. Fundamental <i>Fundamental</i>
	<input type="checkbox"/> C. Engineering & Technology <i>Kejuruteraan & Teknologi</i>
	<input type="checkbox"/> D. Social Transformation <i>Transformasi Sosial</i>
	<input type="checkbox"/> E. Information & Communications Technology (ICT) <i>Teknologi Maklumat & Komunikasi</i>
	<input type="checkbox"/> F. Clinical Sciences <i>Sains Klinikal</i>
	<input checked="" type="checkbox"/> G. Biomedical & Health Sciences <i>Bioperubatan Sains Kesihatan</i>

D.	Duration of this research : <i>Tempoh masa penyelidikan ini :</i>
	*Duration : 3 Tahun <i>Tempoh :</i>
	From : November 2007 To : November 2010 <i>Dari : Ke :</i>

E. **ABSTRACT OF RESEARCH**

(An abstract of between 100 and 200 words must be prepared in **Bahasa Malaysia and in English.**

This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)

Abstrak Penyelidikan

(Perlu disediakan di antara 100 - 200 perkataan di dalam **Bahasa Malaysia dan juga Bahasa Inggeris**. Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar).

This is a two-part study to investigate mental health from two perspectives, namely counseling and neuroscience. **The objective of the first part of the study is how to assess the state of mental health and assist individuals in dealing with mental issues as a primary intervention.** This objective was accomplished by adopting the Mental Health Facilitator program under NBCCI. In line with USM's efforts to have a cadre of mentors in the university, a group of 18 volunteers consisting USM academic and administrative staff underwent 45-hour training and certified as Mental Health Facilitators (MHF) by two trainers from the National Board of Certified Counselors International (NBCCI). USM is the first university in the world to train its employees to become Mental Health Facilitators. The MHF certification is valid for 3 years (2008-2010) and the MHFs have to participate in continuing education programmes. Several of the MHFs then became trainers for subsequent batches of USM Mentors in 2009 and 2010 with a total of 49 throughout the three campuses. In 2010, four of the MHFs trainers were further certified by NBCCI as Master Trainers, the only ones certified to train in Southeast Asia.

Concurrent with the MHF training, **the objective of the second part of the study is to establish the protocol, process and procedures for conducting EEG and neurofeedback research for non-medical researchers.** This objective was accomplished by following the EEG procedure and protocol from EGI. The researchers purchased a EEG 300 System with NetStation and E-Prime. Using 32 Channel Hydrocel Nets, data was gathered from volunteers on several experiments. Two separate experiments by the PhD candidates were the thinking styles of school children and decision making style of managers. However, the two experiments were not able to be completed due to malfunction of the EEG software until the end of grant term. However, the researchers involved presented papers in Australia and Japan and were afforded training in the United States—EGI Summer School for EEG in Eugene, Oregon (July 2009) and BESA Workshop in San Diego, California (November 2010). Notably, our PhD candidate received scholarship to attend and present the Neuroleadership Conference in Boston, MA in October 2010 and to be published in the *Neuroleadership Journal*.

Penyelidikan ini berfokus kepada kesihatan mental dari dua perspektif, kaunseling dan neurosains. Pertama, bagaimana untuk mentaksir kesihatan mental dan membantu individu dalam menangani masalah mental sebagai intervensi awal. Objektif ini telah tercapai dengan menggunakan program Mental

Health Facilitator di bawah NBCCI. Selari dengan usaha USM untuk membangunkan kadre mentor dari kalangan warganya, sekumpulan 18 sukarelawan terdiri daripada staf akademik dan pentadbiran telah melalui latihan selama 45-jam dan diiktiraf sebagai Mental Health Facilitators (MHF) oleh 2 jurulatih pakar dari National Board of Certified Counselors International (NBCCI). USM merupakan universiti pertama didunia yang melatih pekerjaannya untuk menjadi Mental Health Facilitators. Pensijilan MHF adalah untuk 3 tahun (2008-2010) dan MHF perlu melibatkan diri dalam program pendidikan berterusan (CPE). Beberapa MHF kemudiannya menjadi jurulatih kepada Mentor USM pada tahun 2009 dan 2010 menjadikan sejumlah 49 MHF terlatih di ketiga-tiga kampus. Empat jurulatih MHF telah dilatih dan diberi pensijilan sebagai Master Trainer oleh NBCCI pada 2010, yang layak menjalankan latihan MHF di Asia Tenggara.

Selari dengan latihan MHF, objektif bahagian kedua kajian ini adalah untuk protokol, proses dan prosedur untuk menjalankan kajian EEG dan neurofeedback dalam kajian bukan-medikal seperti pendidikan dan bisnes. Objektif ini tercapai dengan menggunakan prosedur and protocol EEG oleh EGI. Penyelidik telah membeli mesin EEG 300 System dengan NetStation dan E-Prime. Data telah dikumpulkan menggunakan 32 Channel Hydrocel Nets daripada sukarelawan dalam dua kajian PhD berasingan tentang gaya pemikiran murid sekolah dan pembuatan keputusan pengurus. Malangnya, kedua eksperimen tidak dapat disempurnakan kerana masalah sofwer EEG sehingga tamat tempoh geran. Walau bagaimana pun, penyelidik telah membentangkan kertaskerja konsep dalam persidangan di Australia dan Jepun dan telah dibiayai utnk menghadiri latihan di Amerika—EGI Summer School for EEG in Eugene, Oregon (July 2009) dan BESA Workshop in San Diego, California (November 2010). Calon PhD telah dianugerahi biasiswa untuk menghadiri dan membentangkan kertaskerja di Neuroleadership Conference, Boston, MA (Oktober 2010) dan artikel akan diterbitkan dalam *Neuroleadership Journal*.