

MASALAH PEMBELAJARAN MATEMATIK  
DAN HUBUNGAN DENGAN SKOR HRV  
DALAM KALANGAN PELAJAR SEKOLAH  
RENDAH

NORSHAFARIZA BINTI MAMAT

SARJANA SAINS

UNIVERSITI MALAYSIA PAHANG

## PENGISYTIHARAN PENYELIA

Kami dengan ini menyatakan bahawa Kami telah menyemak tesis dan pendapat kami, tesis ini adalah mencukupi dari segi skop dan layak untuk penganugerahan Ijazah Sarjana Sains.



Profesor Dr. **Muhammad Nubli bin Abdul Wahab**  
Profesor  
Pusat Sains Kemanusiaan  
Universiti Malaysia Pahang  
Lebuhraya Tun Razak, 26300 Gambang,  
Kuantan, Pahang Malaysia

---

(Tandatangan Penyelia)

Nama Penuh : Profesor Dr. Muhammad Nubli Bin Abdul Wahab

Kedudukan : Profesor Pusat Sains Kemanusiaan

Tarikh : 20 Disember 2022



**Dr. Noradilah binti Md Nordin**  
Pensyarah Kanan  
Pusat Sains Kemanusiaan  
Universiti Malaysia Pahang  
Lebuhraya Tun Razak, 26300 Gambang,  
Kuantan, Pahang Malaysia

---

(Tandatangan Penyelia bersama)

Nama Penuh : Dr. Noradilah Binti Md Nordin

Kedudukan : Pensyarah Kanan Pusat Sains Kemanusiaan

Tarikh : 20 Disember 2022

## **PENGISYTIHARAN PELAJAR**

Saya dengan ini mengisytiharkan bahawa kerja-kerja dalam tesis ini adalah berdasarkan kerja asal saya kecuali sebut harga dan petikan yang telah diakui dengan sewajarnya. Saya juga menyatakan bahawa ia tidak pernah atau serentak dikemukakan untuk mana-mana ijazah lain di Universiti Malaysia Pahang atau mana-mana institusi lain.



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(Tandatangan Pelajar)

Nama Penuh : NORSHAFARIZA BINTI MAMAT

No. Kad Pengenalan : MBP15002

Tarikh : 20 Disember 2022

MASALAH PEMBELAJARAN MATEMATIK DAN HUBUNGAN DENGAN SKOR  
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NORSHAFARIZA BINTI MAMAT

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## ABSTRAK

Penguasaan Matematik penting dalam pembelajaran pelajar sekolah rendah. Terdapat pelbagai punca kelemahan mereka dalam menguasai mata pelajaran ini. Kelemahan sikap dan daya tumpuan merupakan salah satu masalah pembelajaran pelajar. Salah satu ciri keupayaan pelajar dalam penguasaan pembelajaran adalah kebolehan mereka mengawal skor koheren “*Heart Rate Variability – HRV*”. Pengawalan koheren ini membolehkan individu mengawal emosi dan merangsang keupayaan untuk belajar dengan berkesan. Objektif kajian ini adalah untuk meneroka masalah pelajar sekolah rendah luar bandar dalam pembelajaran Matematik, mengenalpasti perbezaan skor HRV dalam kalangan pelajar baik dan lemah pencapaian Matematik serta mengkaji kesan latihan *biofeedback* terhadap skor HRV dalam kalangan pelajar lemah pencapaian Matematik. Metod kajian ini menggunakan pendekatan kualitatif iaitu analisis dokumen dan temubual untuk meneroka masalah pelajar dalam pembelajaran Matematik. Kajian juga menggunakan pendekatan kuantitatif kaedah kuasi eksperimental untuk meneroka perbezaan skor HRV dalam kalangan 28 orang pelajar baik dan lemah pencapaian Matematik, seterusnya, kajian pra dan pasca kumpulan latihan dan kawalan dengan 22 orang pelajar bagi meneroka kesan latihan HRV *biofeedback* terhadap pelajar lemah pencapaian Matematik. Dapatan kajian mendapati punca utama kelemahan pelajar dalam pencapaian Matematik adalah kelemahan penguasaan asas Matematik dan sikap dalam pembelajaran. Kajian menunjukkan terdapat perbezaan skor HRV antara pelajar yang baik dan lemah dalam pencapaian Matematik.

Dapatan menunjukkan latihan *biofeedback* berupaya meningkatkan skor koheren HRV pelajar lemah pencapaian Matematik. Kajian merumuskan skor koheren HRV boleh dijadikan petunjuk terhadap ciri keupayaan penguasaan pelajar dalam pencapaian akademik. Dapatan mendapati latihan *biofeedback* berupaya meningkatkan skor koheren HRV pelajar lemah pencapaian Matematik dan ini menunjukkan peningkatan daya pengawalan emosi dan tumpuan pelajar. Rumusan kajian ini mengukuhkan agar guru mempelbagaikan pendekatan bagi membantu pelajar meningkatkan pencapaian pembelajaran Matematik sekolah rendah luar bandar dan kaedah latihan *biofeedback* berupaya membantu pelajar meningkatkan daya pengawalan emosi bagi membantu meningkatkan pengawalan emosi dan daya tumpuan.

## ABSTRACT

Mastery of mathematics is critical in primary school students' learning. There are numerous reasons for their inability to learn these courses. One of the issues with students' learning is their attitude and focus. One of the elements of students' abilities in learning proficiency is their ability to control the coherence score of "Heart Rate Variability - HRV". This coherent control enables the individual to control emotions and boost the ability to learn efficiently. The purpose of this study was to investigate the problems of rural primary school students in Mathematics learning, to identify differences in HRV scores between good and poor students of Mathematics achievement, and to investigate the effect of biofeedback training on HRV scores between poor students of Mathematics achievement. This study used a qualitative technique, including document analysis and interviews, to investigate students' difficulties in learning Mathematics. The study also used a quantitative methodology of quasi experimental methods to investigate differences in HRV scores among 28 good and weak Mathematical achievement students, followed by pre- and post-training studies with 22 students to investigate the effects of biofeedback HRV training on poor Mathematical achievement students. The study's findings revealed that the main cause of students' Mathematical success deficiency was a lack of basic Mathematical competence and learning attitudes. According to studies, there is a difference in HRV scores between good and poor students in mathematics achievement.

The results demonstrated that biofeedback training can increase the coherence score of HRV students with low Math achievement. The study suggests that HRV coherence scores can be used to predict the qualities of students' mastery abilities in academic achievement. The data revealed that biofeedback training was effective to improve students' HRV coherence scores of poor in math achievement, resulting in an increase in emotional control and focus of students. The findings of this study highlight the need of teachers diversifying their approach to helping students improve their Mathematics learning achievement in rural primary schools, as well as biofeedback training approaches to help students increase emotional control and attention.

## TABLE OF CONTENT

<b>DECLARATION</b>	
<b>TITLE PAGE</b>	
<b>PENGHARGAAN</b>	<b>ii</b>
<b>ABSTRAK</b>	<b>iii</b>
<b>ABSTRACT</b>	<b>iiiv</b>
<b>ISI KANDUNGAN</b>	<b>v</b>
<b>SENARAI JADUAL</b>	<b>ix</b>
<b>SENARAI RAJAH</b>	<b>x</b>
<b>SENARAI GRAF</b>	<b>xi</b>
<b>SENARAI SINGKATAN</b>	<b>xii</b>
<b>SENARAI LAMPIRAN</b>	<b>xiii</b>
<b>BAB 1 PENGENALAN</b>	<b>1</b>
1.1 Pengenalan	1
1.2 Latar Belakang Kajian	4
1.3 Pernyataan Masalah	9
1.4 Objektif Kajian	13
1.5 Persoalan Kajian	13
1.6 Hipotesis Kajian	14
1.7 Kepentingan Kajian	14
1.8 Konsep Kendalian	16
1.8.1 Julat Frekuensi Tinggi ( <i>HF - High Frequency</i> )	16
1.8.2 Julat Frekuensi Rendah ( <i>LF - Low Frequency</i> )	16
1.8.3 Julat Frekuensi Sangat Rendah ( <i>VLF-Very Low Frequency</i> )	17
1.8.4 Pencapaian Matematik	17
1.8.5 Pelajar Berpencapaian Lemah Dalam Matematik	17



1.8.6	Pelajar Berpencapaian Baik Dalam Matematik	18
1.8.7	Soalan Matematik Objektif	18
1.8.8	Soalan Matematik Subjektif	18
1.8.9	Skor Koheren Terkumpul (ACS - <i>Accumulated Coherence Score</i> )	19
1.8.10	Skor Koheren	19
1.9	Kesimpulan	19
<b>BAB 2 SOROTAN KARYA</b>		<b>20</b>
2.1	Pendahuluan	20
2.2	Teknik-Teknik Dalam Pembelajaran Matematik	20
2.3	Kepentingan Memahami Konsep Asas Dalam Pembelajaran Matematik Sekolah Rendah	23
2.4	Teknik-Teknik Penyelesaian Masalah Dalam Pembelajaran Matematik	24
2.5	Punca-Punca Kelemahan Dalam Menguasai Mata Pelajaran Matematik	27
2.6	Kepentingan Kaedah Kemahiran Berfikir Aras Tinggi Dalam Pembelajaran Matematik	30
2.7	Kepentingan Suasana Pembelajaran Terhadap Pencapaian Pelajar Dalam Matematik	31
2.8	Penggunaan Soalan Matematik Berbentuk Objektif Dan Soalan Subjektif Dalam Pembelajaran Matematik	32
2.9	Faktor-Faktor Kelemahan Pendidikan Sekolah Luar Bandar	34
2.10	Teknik <i>Biofeedback</i> Dan Proses Perubahan Diri Dan Prestasi Akademik	35
2.11	Latihan <i>Biofeedback</i> Dan Peningkatan Prestasi Sukan	39
2.12	Latihan <i>Biofeedback</i> Dan Peningkatan Prestasi Pekerjaan	40
2.13	Teknik Latihan Pernafasan Dan Perubahan Diri	40
2.14	Skor HRV Dan Indikator Perubahan Individu	43

2.15	Skor HRV Dan Prestasi Di Kalangan Kanak-Kanak	45
2.16	Kerangka Teori Kajian	46
2.17	Rumusan	48
<b>BAB 3 METODOLOGI KAJIAN</b>		<b>49</b>
3.1	Pengenalan	49
3.2	Kerangka Kajian	49
3.3	Persampelan Kajian	52
3.4	Instrumen Kajian	54
3.4.1	Temubual Berstruktur – Objektif 1	54
3.4.2	Analisis Dokumen – Objektif 1	59
3.4.3	Alat <i>EmWave Biofeedback</i> – Objektif 2 dan objektif 3	65
3.4.4	Prosedur Proses Pengumpulan Data Yang Diperoleh Melalui <i>EmWave</i>	66
3.5	Prosedur Ujian Pilot	68
3.6	Prosedur Pengumpulan Data Objektif 2	69
3.6.1	Protokol Dan Skrip <i>Biofeedback</i> Untuk Objektif 2	70
3.7	Prosedur Pengumpulan Data Objektif 3	75
3.8	Kerangka Konsep Kajian	86
3.9	Rumusan	88
<b>BAB 4 DAPATAN KAJIAN</b>		<b>89</b>
4.1	Pengenalan	89
4.2	Dapatan Objektif 1	89
4.2.1	Analisis Dokumen	89
4.2.2	Analisis Temubual Berstruktur	99
4.3	Dapatan Objektif 2	104

4.3.1	Perbezaan Skor HRV Antara Sesi Pengujian Antara Pelajar Berpencapaian Lemah Dan Berpencapaian Baik Untuk Objektif 2	109
4.4	Dapatan Objektif 3	114
4.4.1	Perbandingan Skor HRV Sebelum Latihan Dan Selepas Latihan <i>Biofeedback</i>	122
4.5	Hipotesis Kajian	126
4.5.1	Hipotesis 1	127
4.5.2	Hipotesis 2	130
4.5.3	Hipotesis 3	134
4.6	Kesimpulan	139
	<b>BAB 5 PERBINCANGAN, RUMUSAN DAN CADANGAN</b>	<b>140</b>
5.1	Pengenalan	140
5.2	Diskusi Dapatan Kajian	140
5.2.1	Diskusi Objektif 1	141
5.2.2	Diskusi Objektif 2	146
5.2.3	Diskusi Objektif 3	151
5.2.4	Diskusi Pengujian Hipotesis	159
5.3	Limitasi Dan Cadangan Kajian Akan Datang	162
5.4	Implikasi Kajian	165
5.5	Kesimpulan	166
	<b>RUJUKAN</b>	<b>168</b>
	<b>LAMPIRAN</b>	<b>182</b>

## RUJUKAN

- Ahmad, O., Nubli, M. (2021). Penggunaan Teknik Biofeedback Berbantuan Latihan Zikir Dalam Meningkatkan Skor Koheren dan Pencapaian Akademik Pelajar Program GALUS. *International Journal of Humanities Technology and Civilization*, 10(3), 64-77.
- Alavi, K., Sail, R. M., Mutalib, L. A., Ahmad, A., Trajo, S. S., & Razak, N. E. A. (2012). Kecerdasan Sosial dan Emosi Guru Cemerlang Pendidikan Islam dalam Meningkatkan Prestasi Pelajar. *e-BANGI*, 7(1), 94-104.
- Alismail, H. A. (2015). Integrate Digital Storytelling in Education. *Journal of Education and Practice*, 6(9), 126–129.
- Amat, U. L., Afferro, I. (2016). *Minat pelajar dalam subjek Matematik sekolah rendah daerah Pontian*. Paper presented at the Seminar Pendidikan Johor 2016, KSL Hotel & Resort Johor. Retrieved from [https://www.researchgate.net/publication/313565119\\_Minat\\_Pelajar\\_dalam\\_Subjek\\_Matematik\\_Sekolah\\_Rendah\\_Daerah\\_Pontian#fullTextFileContent](https://www.researchgate.net/publication/313565119_Minat_Pelajar_dalam_Subjek_Matematik_Sekolah_Rendah_Daerah_Pontian#fullTextFileContent).
- Amornsinlaphachai, P. A. D., K. (2012). Developing the Model of Web-Based Learning Environment Enhancing Problem-Solving for Higher Education Students. *American Journal of Scientific Research*, 52, 21-32.
- Andrea Firth-Clark, Stefan Sütterlin and Ricardo Gregorio Lugo (2019). Using Cognitive Behavioural Techniques to Improve Academic Achievement in Student-Athletes. *Education Sciences*, 9(2), 89. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/educsci9020089>.
- Andreassi, J.L. (2007). *Psychophysiology Human Behaviour and Physiological Response* (5th ed.) New Jersey: Lawrence Erlbaum Associates.
- AQ Sarwari, MN Wahab (2018). The Effectiveness of the Quick Coherence Technique using Heart Rate Variability-Biofeedback Technology on the Recovery of Heart Coherence among University Students, *Pertanika Journal of Science & Technology*, 26 (3), 1539-1546.
- Armine Zarayelyan (2020). *Using HRV Guided Training to Reach the High Sports Performance*. Retrived from <https://biofeedback-neurofeedback-therapy.com/>
- Atherton, J. S. (2013). *Learning and Teaching; Constructivism in learning*. available online from <http://www.learningandteaching.info/learning/constructivism.htm>.

- Atkinson, A. B., Marlier, E., Montaigne F., & Reinstadler, A. (2010). Income poverty and income inequality. In Atkinson, A.B & Marlier, E (eds.), *Income and living conditions in Europe*, Eurostat statistical book.
- Auditya Purwandini Sutarto (2011). *The Effect of Heart Rate Variability Biofeedback Training for Improving Cognitive Performance among Female Manufacturing Operators*. Disertasi Ijazah Doktor Falsafah, Fakulti Kejuruteraan, Universiti Malaysia Pahang, Gambang, Pahang.
- Azrul Fahmi, I., & Marlina, A. (2007). Analisis Kesilapan Dalam Tajuk Ungkapan Al-gebra Di Kalangan Pelajar Tingkatan Empat. *Buletin Persatuan Pendidikan Sains dan Matematik Johor*, 17 (1). 20-30. ISSN 0128-4290.
- Baharudin Omar, Kamarulzaman Kamaruddin dan Nordin Mamat (2002). Faktor Kecemerlangan dan Kemunduran Pelajar di Sekolah Menengah dalam Matematik: Satu Tinjauan. *Prosiding Persidangan Kebangsaan Pendidikan Matematik 2002*, Tanjung Malim, Retrived from <https://www.worldcat.org/title/847978412>.
- Bao Chuanyou. (2006). Policies for Compulsory education Disparity Between Urban and Rural Areas in China. *Frontier Education China*. 40-55.
- Bhasah Abu Bakar. (2007). *Methods of Academic Research Data Analysis*. Kuala Lumpur: Utusan Publications & Distributors.
- BL Thomas, N Claassen, P Becker, M Viljoen (2019). Validity of commonly used heart rate variability markers of autonomic nervous system function. *Neuropsychobiology* 2018/2019;78:14–26.
- Blumenstein, Bar-Eli, dan Tenebaum (1995). A Five-Step Approach To Mental Training Incorporating Biofeedback. *Sport Psychologist*, 11 (4): 440-53.
- Boglárka Brezovszky, Jake McMullen, Koen Veermans, Minna M Hannula-Sormunen, Gabriela Rodríguez-Aflecht, Nonmanut Pongsakdi, Eero Laakkonen, Erno Lehtinen (2019). Effects of a mathematics game-based learning environment on primary school students' adaptive number knowledge. *Computers & Education*. Erno Lehtinen, 63-74.
- Bradley, D., Yani, L.D., Philip, D., & Vecchio, D. (2011). Cognitive Assessment in Behavioral Sport Psychology. *Behavioral Sport Psychology*. 79-95.
- Childre, D., & Martin, H. (1999). *The Heart Math solution*. San Francisco: Harper San Francisco.
- Childre, D., & Rozman, D. (2005). *Transforming stress: The Heart Math solution to relieving worry, fatigue and tension*. Oakland, CA: New Harbinger
- Christensen, L. (2004). *Experimental Methodology* (9 th edition). Boston: Pearson Education, Inc.

- Christer Sjöberg, Jalal Nouri, Rosmarie Sjöberg, Eva Norén, Lechen Zhang (2018). Teaching and learning mathematics in primary school trough Scratch, *International Conference on Education and New Learning Technologies, EDULEARN18 Proceedings*
- Creswell.J.W. (2014). *Research design qualitative, quantitative & mix method approach*. U.K: Sage Publication.
- Crow dan Crow. (1983). *Psikologi Pendidikan Untuk Perguruan*. Kuala Lumpur:
- Dana, L.B., Erin, T. R., Joseph, P.H., (2015) Age Differences in High Frequency Physic Heart Rate Variability and Performance Response To Increased Executive Function Load in Threee Executive Function, *Frontier in Psychology*, doi.org/10.3389/fpsyg.2014.01470
- David Matsumoto dan Jun Konno (2009). Sport Psychology in Combat Sports, Retrieved from <http://davidmatsumoto.com/content/Matsumoto%20Konno%20and%20Ha.pdf>
- David, T., & Razali, M. R. (1993). Diagnosing students' difficulties in learning mathematics. *International Journal of Mathematical Education in Science and Technology*, 24(2), 209-222.
- Dursun, E., Dursun, N., & Alican, D. (2004). Effects of biofeedback treatment on gait in children with cerebral palsy. *Disability and Rehabilitation*. 26(2): 116-120.
- Eisenberg, Jacques, MD; Richman, Rafael (2011). Heart Rate Variability during a Continuous Performance Test in Children with Problems of Attention. Children's Clinic, Community Mental Hearth Center, Herzog Hospital, Jerusalem, Israel. *Isr J Psychiatry Relat Sci* - Vol 48 - No.1 (2011)
- Ellington, A. S. (2011). The role of family time on a young child's overall development ,Masters Disertation, Retrieved from [http://libcontent1.lib.ua.edu/content/u0015/0000001/0000627/u0015\\_0000001\\_0000627.pdf](http://libcontent1.lib.ua.edu/content/u0015/0000001/0000627/u0015_0000001_0000627.pdf)
- Fatimah, A. S., & Santiana, S. (2017). Teaching in 21St Century: Students-Teachers' Perceptions of Technology Use in the Classroom. *Script Journal: Journal of Linguistic and English Teaching*, 2(2), 125. <https://doi.org/10.24903/sj.v2i2.132>
- Feltz, D.L. (1988). Future directions in theoretical research in sport psychology: From applied psychology toward sport science. In I. Skinner (ed.). *Future Directions in Exercise! Sport Research*. Champaign, Ill.: Human Kinetics Press.
- Forehand, M. (2010). *Bloom's Taxonomy From Emeryg Perspective On Learning, Teaching And Technology*, University Of Georgia.
- Forgione, A.G. & Holmberg, R. (1981). Biofeedback therapy. In R.J. Corsini (Ed.), *Handbook of Innovative Psychotherapies*. New York: Wiley.

- Gage, N. L., and Berliner, D. C. (1991). *Educational Psychology*. (5th Ed.), Houghton Mifflin. Boston: The University of Michigan
- Gagné, R. and Briggs, L.J. (1974) *Principles of Instructional Design*. Holton, Rinehart & Winston, New York.
- Gagne, R.(1985). *The Conditions Of Learning*, New York: Holt, Rinehart And Winston.
- Gardella, F.J. (2009). *Introducing Difficult Mathematics Topics in the Elementary Classroom : A Teacher's Guide to Initial Lessons*. New York : Routledge.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*, .Basic Book.
- Garet M, Tournaire N, Roche F, Laurent R, Lacour JR, Barthelemy JC, Pichot V (2004) Individual interdependence between nocturnal ANS activity and performance in swimmers. *Med Sci Sports Exerc* 36(12):2112–2118
- Gevirtz, R., & Lehrer, P.M. (2003). *Resonant Frequency Heart Rate Biofeedback*. In *Biofeedback: A Practioner's Guide* (3rd ed.) pp. 245-250. M. S. Schwartz and F. Andrasik (Eds.). New York. The Guilford Press.
- Gilbert, C., & Moss, D. (2003). Biofeedback and biological monitoring. In D. Moss, A. McGrady, T.Davies, & I Wickramaskera. *Handbook of Mind-Body Medicine in Primary Care: Behavioral and Physiological Tools*. Thousand Oaks, CA: Sage.
- Harskamp, E., & Suhre, C. (2007). Schoenfeld's problem solving theory in a student controlled learning environment. *Computers and Education*, 49(3), 822–839. doi:10.1016/j.compedu.2005.11.024
- Hazram Ismail & Nurulain Nabilah Hamzu. (2020). Pengintegrasian KBAT dalam Pengajaran Matematik semasa Praktikum dalam Kalangan Bakal Guru Sekolah Rendah. *Journal of Advanced Research in Social and Behavioural Sciences*, 19(1), 80-89.
- HeartMath LLC (2010). *HeartMath® Interventions for Counselors, Therapists, Social Workers and Health Care Professionals - Establishing a New Baseline for Sustained Behavioral Change*. California: HeartMath
- Herryan Syah (2020, Ogos 21). 19 Cara Membantu Pelajar Lemah. Retrived from <https://mudahmengajar.blogspot.com/>
- Horizon Report: 2014 K-12 Edition. (2014). Horizon Report. Retrived from <http://doi.org/ISBN978-0-9914828-5-6>
- Idris, N. (2005). *Penyelidikan dalam Pendidikan*. Malaysia: Mc Graw Hill.

- Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas (2015) Effects of Computer-Assisted STAD, LTM and ICI Cooperative Learning Strategies on Nigerian Secondary School Students' Achievement, Gender and Motivation in Physics. *Malaysian Online Journal of Educational Sciences*, 3, 11- 26.
- Jacquest Eisenberg et. al., (2011) Heart Rate Variability During A Continous Performance Test With Problems of Attention, *Israel Journal of Psychiatry*, 48(1), 19-24
- Jamian, R. and Taha, H. (2020) “Analisis keperluan kebolegunaan aplikasi mudah alih terhadap sikap, minat dan pengetahuan asas Matematik tahun 4: Need analysis of mobile application usability specifications for mathematics year 4: constructs of attitude, interest and basic knowledge”, *Jurnal Pendidikan Sains dan Matematik Malaysia*, 10(1), pp. 9–15. doi: 10.37134/jpsmm.vol10.1.2.2020.
- Karacop, A. (2016). Effects of Student Teams-Achievement Divisions Cooperative Learning with Models on Students’ Understanding of Electrochemical Cells. *International Education Studies*, 9(11). doi:10.5539/ies.v9n11p104.
- Kassim, N., & Zakaria, E. (2015). Integrasi Kemahiran Berfikir Aras Tinggi Dalam Pengajaran Dan Pembelajaran Matematik: Analisis Keperluan Guru. *Prosiding Seminar Education Graduate Regional Conference*, 60-67, Medan: Unimed Press.
- Kazuhiko Nunokawa (2006). Using Drawings And Generating Information In Mathematical Problem Solving Processes. *Eurasia Journal of Mathematics, Science and Technology Education*, 2(3). Joetsu University of Education.
- Kementerian Pendidikan Malaysia (2013). Pelan Pembangunan Pendidikan Malaysia 2013-2025, Pendidikan Pra Sekolah hingga Lepas Menengah, Retrieved from <https://www.moe.gov.my/dasarmenu/pelan-pembangunan-pendidikan-2013-2025>.
- Kementerian Pendidikan Malaysia (2013). *Pelan pembangunan pendidikan Malaysia 2013-2025*. Putrajaya: Bahagian Pembangunan Kurikulum.
- Khair Kassim (2020, Ogos 21). Kaedah Pengajaran Pelajar Berpencapaian Sederhana, Lemah, Galus, Halus Atau Garuk. Retrived from <https://hjmsaad.blogspot.com/>
- Kirkcaldy, B. D. & Christen, J. (1981). An investigation into the effect of EMG frontalis biofeedback on physiological correlates of exercise. *International Journal of Sport Psychology*, 12(4), 235-252.
- Kiviniemi, A.M., Hautala, A.J., Kinnunen, H. (2007), Endurance training guided individually by daily heart rate variability measurements. *Eur J Appl Physiol* 101, 743–751 (2007). <https://doi.org/10.1007/s00421-007-0552-2>
- Kow, C., Peter, H., Mahmud, R., Daud, S. M., & Mohd, A. F. (2015). Hubungan antara amalan bermain permainan komputer dengan kemahiran penyelesaian masalah, kreativiti dan pemikiran kritis murid. In: *Graduate Research in Education Seminar (GREduc 2013)*, 1 Dec. 2013, Faculty of Educational Studies, Universiti Putra Malaysia, 412-418.



- Kulik, A.L., Martynenko, A.V., & Yabluchansky, N.I. (2012). Biofeedback Quality in Healthy Volunteers in Paced Breathing Algorithm Starting from the Age Physiological Norm. *5th European Conference of the International Federation for Medical and Biological Engineering IFMBE Proceeding*. (37):408-411.
- Lee, Y. H., Hsiao, C., & Purnomo, S. H. (2014). An empirical examination of individual and system characteristics on enhancing e-learning acceptance, *Australasian Journal of Educational Technology*, 30(5), 561-579. Retrieved from: <http://ascilite.org.au/ajet/submission/index.php/AJET/article/view/381/1080>
- Lehrer, P. & Vaschillo, E. (2008). The Future of Heart Rate Variability Biofeedback. *Association for Applied Psychophysiology & Biofeedback*. 36(1): 11-14.
- Lehrer, P. M., & Vaschillo, E.G. (2001). Resonant Frequency Heart Rate Biofeedback: Effect on Cardiovascular and Baroreflex Function. *Biological Psychology*; 575.
- Lehrer, P. M., dan Kranitz, L. (2004). Biofeedback applications in the treatment of cardiovascular diseases. *Cardiology in Review*. 12(3): 177-181.
- Lehrer, P.M. (2007). Biofeedback Training in Increase Heart Rate Variability. In *Principles and Practice of Stress Management*. 3rd ed. New York: The Guilford Press.
- Lehrer, P.M., & Kranitz, L. (2003). Biofeedback Applications in the Treatment of Cardiovascular Diseases. *Cardiology in Review*, 12(3), 177-181.
- Lembaga Peperiksaan (2013). *Pentaksiran Kemahiran Berfikir Aras Tinggi*. Kementerian Pendidikan Malaysia, Kuala Lumpur.
- Lembaga Peperiksaan (2014). Laporan Kajian Pelaksanaan PBS : Dokumen Standard Prestasi. *Kajian Berkaitan Pentaksiran Berasaskan Sekolah*. Kuala Lumpur: Kementerian Pelajaran Malaysia.
- Lim Beng Tin (2000), *Penyelidikan mengenai jenis kesilapan dalam menyelesaikan masalah Matematik berayat bagi pelajar tingkatan dua*. Tesis Sarjana Muda, Universiti Teknologi Malaysia
- Loh, S. C., Habibah Elias, Sharifah Mohd Nor, Rahil Mahyuddin, and Jegak Uli. (2004). *Effects of strategy instruction and attribution retraining on students academic achievement*, *Journal of Educational Research*, 24, 83-91
- LPM, (2015). Format dan Instrumen Contoh UPSR 2016. Lembaga Peperiksaan Malaysia, Kementerian Pendidikan Malaysia. Retrived from [http://www.lp.edu.my/v1/index.php?option=com\\_content&view=article&id=627:format-daninstrumen-contoh-upsr-2017&catid=159:maklumat-am-upsr&Itemid=108&lang=enpada](http://www.lp.edu.my/v1/index.php?option=com_content&view=article&id=627:format-daninstrumen-contoh-upsr-2017&catid=159:maklumat-am-upsr&Itemid=108&lang=enpada) 25 Ogos 2015.
- Luft, C. D. B., Takase, E. & Darby, D. (2009). Heart Rate Variability and Cognitive Function: Effects of Physical Effort. *Biological Psychology*. 82: 186-191.

- Maryn, Y., De-Bodt M., & Van Cauwenberge. P. (2006). Effects of Biofeedback in Phonator Disorders and Phonatory Performance: A Systematic Literature Review. *Applied Psychophysiology and Biofeedback*. March 2006. (31):65-83.
- Marzita Puteh (2002). *Factors Associated with Mathematics Anxiety*. Tanjung Malim: Penerbit UPSI.
- Marzita Puteh (2002). *Matematik Permulaan*. Prentice Hall Pearson Malaysia. Petaling Jaya.
- Masyuniza Yunos, (2015) *Hubungan sikap dan persepsi pelajar terhadap pembelajaran Bahasa Melayu dengan kemahiran abad ke-21*. *Jurnal Pendidikan Bahasa Melayu ; Malay Language Education (MyLEJ)*, 5 (2). pp. 22-30. ISSN 2180-4842
- Maziah Binti Mohd Sapar, (2013). *Keberkesanan Kaedah Latihan Biofeedback Emwave Terhadap Prestasi Membaca Pelajar-Pelajar Linus, Di Sekolah Kebangsaan Jengka Batu 13, Chenor*, Tesis Sarjana, Universiti Malaysia Pahang.
- Maziah Mohd Sapar , Muhammad Nubli Abdul Wahab (2012), Keberkesanan Modul LINUS Berbantuan Terapi Biofeedback EmWave terhadap Pelajar-Pelajar, di Zon Chenor Pahang, *Seminar Internasional Pelajar Pasca Siswazah Pendidikan Khas*, Universiti Kebangsaan Malaysia, retrieved from <http://umpir.ump.edu.my/id/eprint/4400/1/pbmsk-2012-nubli-KeberkesananModulLinus 5feb14.pdf>
- Mc Craty, R. (2015). *Science of the Heart: Exploring the Role of the Heart in Human Performance*. (Vol.2) USA: HeartMath Institute.
- Michael A Cobelen (2006). *Student Problem Solving*, Lincoln: University of Nebraska.
- Miller, S.P. dan Mercer C.D. (1997). Educational aspects of mathematics disabilities. *Journal of learning of disabilities*. 30 (1); 47-56.
- MN Wahab, AQ Sarwari, (2018). The relationship between zikir (remembrance of allah), heart coherence and intrapersonal communication among muslim postgraduate students from different countries, *Journal Of Language & Communication*, 5(1) 110-123.
- Mohd. Rashidi Bin Mat Jalil, 2008, *Keberkesanan Kaedah Petak Sifir Dalam Penguasaan Fakta Asas Darab Dalam Matematik Tahun 4: Satu Kajian Di Sekolah Kebangsaan Mersing Johor*, Retrieved from <http://eprints.utm.my/id/eprint/11928/>
- Mohd. Zaki Ishak & Narawi Abu Bakar (2019) “Keberkesanan Model Responseto-Intervention (RTI) dalam Menyelesaikan Masalah Matematik Berayat Pelajar Sekolah Rendah”, *Borneo International Journal of Education*, Vol. 1 (December, 2019), 57 – 74.
- Mok Soon Sang (2002). *Pedagogi: Untuk Kursus Diploma Perguruan Semester 3*. Edisi Ketiga. Kuala Lumpur: Percetakan Sentosa Sdn. Bhd.
- Mok Soon Sang. (1995). *Pengajian Matematik Untuk Kursus Perguruan*, Kuala Lumpur : Kumpulan Budiman Sdn.Bhd.

- Montague (1993). Mathematical problem solving characteristics of middle school students with learning disabilities. *Journal of special education*. 27 (2); 175-201.
- Moss, D. (2004). Heart Rate Variability Biofeedback. *Psychophysiology Today*. Issue 1, Retrieved from [http://www.bfe.org/articles/issue1\\_final.pdf](http://www.bfe.org/articles/issue1_final.pdf).
- Moss, D., & Shaffer, F. (2009). Respiratory Training and Heart Rate Variability Biofeedback for Anxiety Disorders and Functional Medical Disorders: Respiratory Psychophysiology. Workshop Notes. *The 13th Annual Meeting of Biofeedback Foundation of Europe*, Eindhoven, Netherlands. February 24.
- Muhamad Zaki, Samsudin Razali bin Hassan, Azman Hasan (2013) Kreativiti guru dalam pengajaran mata pelajaran kemahiran hidup, *Prosiding Konvensyen Kebangsaan Pendidikan Guru 2013*. Vol 1, [DOI: 10.13140/2.1.3478.7846](https://doi.org/10.13140/2.1.3478.7846).
- Muhyidin Arsat & Maizura Mohd Yunus, (2011), Satu Kajian Cabaran Guru di Sekolah . Retrieved 13 November, 2015, Retrieved from eprint@utm: [http://eprints.utm.my/11803/1/Satu\\_Kajian\\_Cabaran\\_Guru\\_Di\\_Sekolah](http://eprints.utm.my/11803/1/Satu_Kajian_Cabaran_Guru_Di_Sekolah)
- Nath, S R, Sylva, K, dan Grimes, J. (1999). Raising Education Levels in Rural Bangladesh: The Impact of A Non-formal Education Programme. *International Review of Education*, 45 (1), 1-22.
- National Council of Teachers of Mathematics, NCTM. (2000). *Principles and Standards for School Mathematics*. Reston. VA: Au
- Nazrolnizah, Mohamad Noorzeli (2014) *Hubungan di antara Prestasi Perniagaan dengan Profil HRV Biofeedback Usahawan Amanah Ikhtiar Malaysia*. *Akademika*, 84 (1&2). pp. 45-56.
- Nazrolnizah, Mohamad Noorzeli and Muhammad Nubli, Abdul Wahab (2016) *A Study of the Usage of Biofeedback Techniques to Improve Self Performance and HRV Profile Among Ikhtiar Malaysia Entrepreneurs*. *Malaysian Journal of Social Sciences and Humanities (MJ-SSH)*, 1 (3) 1-13. ISSN 2504-8562
- Niemi, H., Niu, S., Vivitsou, M., & Li, B. (2018). Digital Storytelling for Twenty-First-Century Competencies with Math Literacy and Student Engagement in China and Finland. *Contemporary Educational Technology*, 9(4), 331–353. <https://doi.org/10.30935/cet.470999>
- Noh, M. A. M., Ilias, M. F., Husain, K., Sulaiman, M. S., & Abdullah, M. (2016). Inisiatif dan usaha guru dalam meningkatkan pengetahuan semasa penggunaan bahan bantu mengajar. *Journal of Social Sciences and Humanities*, 3, 133-144.
- Nooriza Kassim & Effandi Zakaria (2013). Integrasi Kemahiran Berfikir Aras Tinggi dalam Pengajaran dan Pembelajaran Matematik: Analisis Keperluan Guru. *Persidangan*

*Serantau Siswazah Pendidikan Melestari Pendidikan: Membangun Sumber Daya Manusia*, Bangi : Universiti Kebangsaan Malaysia.

- Nor'aini Tahir. et. al. (2007). *Perkembangan Kognitif dan Pembelajaran Kanak-kanak*, Kuala Lumpur : PTS Professional Publishing Sdn.Bhd.
- Noraini Idris (2005). *Pedagogi Dalam Pendidikan Matematik*, Kuala Lumpur: Utusan Publications & Distributors Sdn Bhd.
- Norawati Binti Hashim, (2004). *Hubungan Pencapaian Matematik Pelajar- Pelajar Melayu Sekolah Rendah Luar Bandar Mengikut Minat Dan Jantina*, Universiti Pendidikan Sultan Idris: Tesis Sarjana Muda.
- Norazlin Mohd Rusdin & Siti Rahaimah Ali. (2019). Amalan dan Cabaran Pelaksanaan Pembelajaran Abad Ke-21. *Proceeding of The International Conference on Islamic Civilization and Technology Management*. UniSZA. 23-24 November 2019.
- Norazrena Abu Samah & Shahrudin Md Salleh (2011). Laman Web Matematik bagi tajuk Kebarangkalian berpandukan Sembilan Aspek Pengajaran Gagne dan Teori Perlaziman Operan Skinner. *Jurnal Teknologi Pendidikan Malaysia*, 1(1): 63- 73.
- Norizan, Y. & Nubli, W. (2017). The Effective Impact of Integration of Body Oriented Psychotherapy, Spirituality, and Biofeedback Techniques on Discipline Troubled Students of Technical Training Institution, *The International Journal Of Humanities & Social Studies*, 5 (8), 280-286.
- Norsuhaila Musa, Mohamad Hilmi Mat Said, Muhammad Nubli Abdul Wahab. (2014). Aplikasi Khusuk Solat Menerusi Pendekatan Teknik Biofeedback. *'Ulum Islamiyyah Journal*. 13: 3-18.
- Norsyaidah Seliaman, Mohd Uzi Dollah (2018). Pengajaran Matematik Sekolah Rendah Menggunakan pendekatan Konstektual: Satu kajian kes, *Jurnal Pendidikan Sains dan Matematik Malaysia*: Vol. 8 No. 2 (2018): *Jurnal Pendidikan Sains Dan Matematik Malaysia*
- Nor Ezah Binti Ariffin Nurulwahida Binti Hj. Azid @ Aziz (2016). Persepsi Pelajar Tahun Lima Terhadap Penggunaan Kaedah Model Bar Dalam Penyelesaian Masalah Matematik Berayat Tajuk Pecahan. International Seminar on Generating Knowledge Through Research, UUM-UMSIDA, 25-27 October 2016, Pusat Pengajian Pendidikan dan Bahasa Moden, Universiti Utara Malaysia. *Proceeding of ICECRS*, 1 (2016) 287-304 ISSN: 2548-6160. Available online: <http://ojs.umsida.ac.id/index.php/icecrs> Article DOI: <http://dx.doi.org/10.21070/picecrs.v1i1.613>
- Nubli (2015). *Merubah diri dalam 21 minit menggunakan teknik biomaklumbalas*, Kuantan: Penerbit UMP.

- Nur Adilla Syafiqah Mohd Shafii, Roslinda Rosli, & Siti Farah Idayu Madi. (2021). Tahap keupayaan pelajar tahun enam dalam menjana masalah Matematik semi-berstruktur. *Jurnal Dunia Pendidikan*, 3(1), 645–654.
- Osman Rani Hassan & Rajah Rasiah (2011). Poverty and Student Performance in Malaysia. *Institutions and Economies (formerly known as International Journal of Institutions and Economies)*, 2011, vol. 3, issue 1, 61-76
- P. A. Fitzsimmons, D. M. Landers, J. R. Thomas, H. Van Der Mars** (1991). Does self-efficacy predict performance in experienced weightlifters? **Research Quarterly for Exercise and Sport**, *PubMed*, 62(4):424-31 DOI:**10.1080/02701367.1991.10607544**.
- Pagaduan, Jeffrey; Wu, Sam S. X.; Kameneva, Tatiana.; Lambert, Elisabeth. Acute effects of resonance frequency breathing on cardiovascular regulation, *Physiological Reports*, Vol. 7, no. 22 (Nov 2019), article no. e14295.
- Palanski, M.E., dan Yammarino, F. J. (2007). Integrity and leadership: Clearing the conceptual confusion. *European Management Journal*. 25: 171-184.
- Peira, N., Fredrikson, M., & Pourtois, G. (2014). Controlling the Emotional Heart: Heart Rate Biofeedback Improves Cardiac Control during Emotional Reactions. *International Journal of Psychophysiology*, 91(3), 225–231.
- Peper, E., Tylova, H., Gibney, K.H., Harvey, R., & Combatalade, D. (2008). *Biofeedback Mastery-An Experiential Teaching and Self-Training Manual*. California: AAPB
- Philips, D.C.(2000). *Constructivism in Education: Opinions and Second Opinions on Controversial Issues*. (Ninety-ninth year- book of The National Society for the Study of Education, Chicago)- 19-40 : University of Chicago Press.
- P. L. KU, & S. C. Johnson LIM. (2018). Pelaksanaan Dan Keberkesanan Kaedah LATTICE Dalam Pengajaran Kemahiran Matematik: Satu Kajian Kes Di Sekolah Rendah. S.J.K.(C) Chung Cheng, Batu Pahat, Johor, Malaysia, Faculty of Technical and Vocational Education, UTHM, Johor, Malaysia, *Online Journal for TVET Practitioners*. Retrieved from <https://publisher.uthm.edu.my/ojs/index.php/oj-tp/article/view/4816>.
- Polya, G. (1957). *How to Solve It. A New Aspect of Mathematical Method*. 2nd Edition, Princeton: Princeton University Press.
- Prima Vitasari, Muhammad Nubli Abdul Wahab, Tutut Herawan, Suriya Kumar Sinnadurai, Ahmad Othman, Muhammad Ghani Awang (2011). Assessing of Physiological Arousal and Cognitive anxiety toward Academic Performance: The Application of Catastrophe Model. Faculty of Manufacturing Engineering and Technology Management- Center of Modern Language and Human Science, Faculty of Computer System and Software Engineering Universiti Malaysia Pahang. Elsevier Ltd.

- Radatz H. (1979). Error Analysis in the Mathematics Educations. *Journal for Research in Mathematics Educations*. Vol. 9, page 163-172.
- Richard Denny (1993), *Motivate to Win: Tested Techniques for Greater Achievement*, Kogan Page Publishers.
- Richard M. Suinn, Robert D. Clayton (1980). *Psychology in Sports : Methods and Applications*. Minneapolis, Burgess Pub. Co.
- Robbins. Jim. (2000). *A Symphony in the Brain: The Evolution of the New Brain Wave Biofeedback*. Boston: Atlantic Monthly Press.
- Rohaty Mohd Majzub. (2003). *Pendidikan prasekolah: Cabaran Kualiti (Syarahan Perdana)*. Bangi: Penerbitan Malindo Sdn. Bhd.
- Roshlawaty Raieh. (2020). *Three Young Teachers Share 'Learning Ideas' Using Model 5E Constructivism*, Kuala Lumpur: GPS Bestari.
- Sabilan, S., Lip, S. M., Ishak, M. F., Abidin, S. Z., & Sulaiman, S. H. (2018). Konsep penerapan dan penghayatan nilai-nilai murni berasaskan Falsafah Pendidikan Kebangsaan (FPK). In Conference: *International Conference on Moslem Society 2016*. Retrieved from [https://www.researchgate.net/profile/Sapie-Sabilan/publication/325194360\\_Konsep\\_Penerapan\\_Dan\\_Penghayatan\\_Nilai-Nilai\\_Murni\\_Berasaskan\\_Falsafah\\_Pendidikan\\_Kebangsaan\\_FPK/links/5afd4067a6fdcc3a5a275ab2/Konsep-Penerapan-Dan-Penghayatan-Nilai-Nilai-Murni-Berasaskan-Falsafah-Pendidikan-Kebangsaan-FPK.pdf](https://www.researchgate.net/profile/Sapie-Sabilan/publication/325194360_Konsep_Penerapan_Dan_Penghayatan_Nilai-Nilai_Murni_Berasaskan_Falsafah_Pendidikan_Kebangsaan_FPK/links/5afd4067a6fdcc3a5a275ab2/Konsep-Penerapan-Dan-Penghayatan-Nilai-Nilai-Murni-Berasaskan-Falsafah-Pendidikan-Kebangsaan-FPK.pdf)
- Sadock, B., Kaplan & Sadock (2002). *Synopsis of psychiatry: behavioural sciences, clinical psychiatry* (9th ed.). UK: Lippincott Williams & Wilkins.
- Saras Krishnan, and Noraini Idris (2015). *An overview of students' learning problems in hypothesis testing*. *Jurnal Pendidikan Malaysia*, 40 (2). pp. 193-196. ISSN 0126-6020 / 2180-0782
- Selder, H. (1982). Psychology preparation of Olympic athletes: Atleica Stuch (ITA). *International Journal of Sport Psychology*. 5: 65-84.
- Shaffer, F., & Moss, D. (2006). *Biofeedback. Textbook of Complementary and Alternative*, UK: Informa Healthcare.
- Shearer, A., Hunt, M., Chowdhury, M., & Nicol, L. (2016). Effects of a brief mindfulness meditation intervention on student stress and heart rate variability. *International Journal of Stress Management*, 23(2), 232–254. <https://doi.org/10.1037/a0039814>.
- Sherlin, L., Gevirtz, R., Wyckoff, S. & Muench, F. (2009). Effects of Respiratory Sinus Arrhythmia Biofeedback versus Passive Biofeedback Control. *International Journal of Stress Management*, 16 (3): 233–248.

- Sidek Mohd Noah & Jamaludin Ahmad. (2005). *Pembinaan Modul: Bagaimana Membina Modul Latihan dan Modul Akademik*, Serdang: Penerbit Universiti Putra Malaysia
- Siepmann, M., Aykac, V., Unterdörfer, J., Petrowski, K. & Mueck-Weymann, M. (2008). A Pilot Study on the Effects of Heart Rate Variability Biofeedback in Patients with Depression and in Healthy Subjects. *Applied Psychophysiology and Biofeedback*, 33: 195–201.
- Silva, CC., Pereira LM, Cardoso, JR, Moore, JP, Nakamura, FY. (2014), The effect of physical training on heart rate variability in healthy children: a systematic review with meta-analysis. *Pediatric Exercise Science*, 26(2): 147-158.
- Simon, W. (2016) *How to use HRV to measure and manage Total Load with Simon Wegerif*, EP#162. Retrieved from <https://scientifictriathlon.com/>.
- Siti Marlina Sabran (2013), *Kemahiran Berfikir Aras Tinggi (Kbat) Pelajar Tingkatan 5 Dalam Penyelesaian Masalah Matematik*, Tesis Sarjana, Universiti Teknologi Malaysia. Retrieved from <http://eprints.utm.my/id/eprint/42146/4/SitiMarlinaSabranFP2013.pdf>
- Siti Masayu Rosliah Abdul Rashid. (2009). *Peluang dan Cabaran Pendidikan dalam kalangan Masyarakat Luar Bandar: Satu Kajian Kes Isi Rumah Melayu Miskin di Jajahan Bachok, Kelantan*. Tesis Sarjana, Universiti Sains Malaysia.
- Stoica, A. (2015). Using Math Projects in Teaching and Learning. *Procedia - Social and Behavioral Sciences*, 180(November 2014), 702–708. <https://doi.org/10.1016/j.sbspro.2015.02.181>
- Subahan M. Meerah. (1999). *Dampak Penyelidikan Pembelajaran Sains Terhadap Perubahan Kurikulum*. Bangi: Univerisiti Kebangsaan Malaysia.
- Sulaiman Masri (2003). *Kaedah Penyelidikan dan Panduan Penulisan (Esei, Proposal, Tesis)*, Kuala Lumpur: Utusan Publications & Distributors Sdn, Bhd.
- Sulaiman, E. (2003). *Asas Pedagogi*. Johor Baharu: Universiti Teknologi Malaysia.
- Sutarto AP, Wahab MN, Zin NM (2008). Effect of biofeedback training on operator's cognitive performance, *Work*, 2013;44(2):231-43. doi: 10.3233/WOR-121499. PMID: 23324677.
- Taelman J., Vandeput S., Spaepen A., Van Huffel S. (2009) Influence of Mental Stress on Heart Rate and Heart Rate Variability. In: Vander Sloten J., Verdonck P., Nyssen M., Hauelsen J. (eds) *4th European Conference of the International Federation for Medical and Biological Engineering. IFMBE Proceedings*, vol 22. Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-540-89208-3\\_324](https://doi.org/10.1007/978-3-540-89208-3_324)
- Tharion, E., Parthasarathy, S. dan Neelakantan, N. (2009). Short-term heart rate variability measures in students during examinations, *The national medical journal of India*, 22 (2): 63-66.

- Joan Ferrini-Mundy (2000), *Principles and Standards for School Mathematics: A Guide for Mathematicians*, Retrieved from <https://www.ams.org/notices/200008/comm-ferrini.pdf>
- Todaro, M.P. and Smith, S.C. (2003), *Economic Development*. 8th Edition, Longman Publication, New York, 110.
- Ucus, S. (2015). Elementary School Teachers' Views on Game-based Learning as a Teaching Method. *Procedia - Social and Behavioral Sciences*, 186, 401–409. <https://doi.org/10.1016/j.sbspro.2015.04.216>.
- Viro, E., & Joutsenlahti, J. (2018). The starT project competition from the perspective of mathematics and academic literacy. *Education Sciences*, 8(2). <https://doi.org/10.3390/educsci8020067>.
- Vitasari, P., Wahab, M. N. A., Herawan, T., Othman, A., & Sinnadurai, S. K. (2011). A pilot study of pre- post anxiety treatment to improve academic performance for engineering students. *Procedia - Social and Behavioral Sciences*, 30 (15) 3826–3830.
- Vitasari, P., Wahab, M. N. A., Herawan, T., & Sinnadurai, S. K. (2011). Psychophysiological treatment in reduced anxiety with biofeedback training for university students. *Procedia-Social and Behavioral Sciences*, 30, 629-633.
- Wan Naliza dan Siti Mistima (2020). Hubungan antara motivasi dengan pencapaian Matematik dalam kalangan pelajar sekolah luar bandar. *Jurnal Pendidikan Sains Dan Matematik Malaysia*. Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia. Vol. 10 No. 1.
- Warner, S., & Kaur, A. (2017). The Perceptions of Teachers and Students on a 21 st Century Mathematics Instructional Model. *International electronic journal of mathematics education e-issn:*, 12(2), 193–215.
- Wenz, B, & Strong.(1980). An application of biofeedback and self regulation procedures with superior athletes. In R.W. Suinn (ed.). *Psychology in Sports: Methods and Applications*, Minneapolis: Burgess Publishing Company, 310-333.
- Winsley, R.J., Armstrong, N., Bywater, K., Fawkner, S.G. (2013) Reliability Of Heart Rate Variability Measures At Rest And During Light Exercise In Children, *British Journal of Sport Medicine*, 37(6) , <http://dx.doi.org/10.1136/bjism.37.6.550>
- Yahya Othman, (2004), *Mengajar Membaca: Teori dan Aplikasi. Panduan Meningkatkan Kemahiran Mengajar Membaca*, Kuala Lumpur: PTS Publication & Distributor Sdn. Bhd.
- Zaichkowsky, L. dan Fuchs, C. (1988). Biofeedback applications in exercise and athletic performance. *Exercise and Sport Science Review*. 16: 381-421.
- Zainuddin Abu Bakar & Mohd Rashidi Bin Mat Jalil (2010), *Keberkesanan Kaedah petak Sifir Dalam Penguasaan Fakta Asas Darab Dalam Matematik Tahun 4: Satu Kajian di Sekolah Kebangsaan Mersing, Johor*, Tesis Sarjana Muda Fakulti Pendidikan, Universiti



Teknologi Malaysia.

- Zainudin Abu Bakar & Fazilah Tumin. (2011), Hubungan Antara Minat Pelajar dan Sikap Ibu Bapa Dengan Prestasi Matematik Terbaik Pelajar, *Journal of Educational Psychology and Counseling*, UTM, volume 1(Mac): 25-43 ISSN: 2231-735X
- Zamri Mahamod (2012), *Inovasi P&P dalam pendidikan Bahasa Melayu*, Tanjung Malim: Universiti Pendidikan Sultan Idris.
- Zarinah Arshat dan Rozumah, (2011), Perkaitan antara faktor status sosioekonomi dan kualiti tingkahlaku keibubapaan dalam keluarga berisiko, *Jurnal Kemanusiaan*, 17(Jun 2011), Faculty of Management, Universiti Teknologi Malaysia.
- Zukina Yusof (2003). *Hubungan Antara Latar Belakang Keluarga Dengan Pencapaian Akademik Pelajar Melayu Dalam PMR*, Tesis Sarjana Sains (Pengurusan Pendidikan) Universiti Utara Malaysia.
- Zulkifli A.H, Jamilah. O, Aminah. A. & Ismi A.I, (2011), Hubungan Antara Penglibatan Iubapa Dan Pencapaian Akademik Pelajar Miskin Di Negeri Selangor, *Journal of Islamic and Arabic Education*, 3(2), 31-40. Universiti Putra Malaysia.
- Zuraidah Abdullah (2010), *Profil Komuniti Pembelajaran Profesional Sekolah Menengah Di Malaysia*, Tesis Ph.D, Universiti Malaya.