



Cawangan Kedah  
Kampus Sungai Petani

Faculty of Administrative  
Science and Policy Studies

# i-SPIKE 2021

*Leading An Artificial Innovation In Knowledge, Education And Design*

## **i-SPIKE 2021 INTERNATIONAL EXHIBITION & SYMPOSIUM E-PROCEEDINGS**

<https://ispik2021.uitm.edu.my/>

e-ISBN 978-967-2948-20-9

Copyright © 2021 is held by the owner/author(s). These papers are published in their original version without editing of the content.

The views, opinions and technical recommendations expressed by the contributors are entirely their own and do not necessarily reflect the views of the Faculty or the University.

Copy Editors : Azni Syafena Andin Salmat, Syazliyati Ibrahim, Asrol Hasan, Nor Zaini Zainal Abidin, Fatimah Norazami Abdullah, Chaleeda Som Sak, Nor Asni Syahriza Abu Hassan & Muhamad Khairul Anuar Zulkepli

Layout Editor : Asrol Hasan

Cover Design : Syahrini Shawalludin

Published by : Universiti Teknologi MARA Cawangan Kedah,  
Kampus Merbok,  
08400 Merbok,  
Kedah,  
Malaysia.

## TABLE OF CONTENTS:-

### i-SPIKE 2021 International Exhibition & Symposium E-Proceedings

NO.	TITLE	PAGE
1.	‘Viewfinder’ Mobile Learning Application for Videography and Cinematography Based on the Rules of Perspective <i>Amir Nor Azan Samar, Harim Izzati Hamdan, Iqbal Jaapar &amp; Muhammad Firdaus Amairudin</i>	1
2.	Systematic Alternative Fuzzy Logic Evaluator (SAFLE) for Student Performance Evaluation <i>Shirley Sinatra Gran, Tracy Adeline Ajol &amp; Awang Nasrizal Awang Ali</i>	8
3.	360 Employees – I <i>Dayang Hazenah Awang Abdul Hamid, Nur Dina Athia Mohd Ramley, Nur Hidayah Jusoh, Nurul Husna Abd Jalil &amp; Mohammad Firdaus Mohammad Hatta</i>	12
4.	AbMTI: Adventure Based Mental Toughness Inventory for Post Covid-19 Pandemic Era <i>Mohd Shariman Shafie, Professor Dato Dr. Md Amin Md Taff, Dr. M.Adli bin Mohd Sidi, Mohamed Azizul bin Mohamed Afandi, Dr. Omar Firdaus Mohd Said &amp; Nik Jazwiri Johannis</i>	18
5.	AbMTM: Post Covid-19 Adventure-Based Mental Toughness Training Model <i>Mohd Shariman Shafie, Professor Dato’ Dr. Md Amin Md Taff, Assoc. Professor Dr. Zuraidah Zainol &amp; Dr. Siti Musliha Mat Rasid</i>	23
6.	Pembentukan Modul Undi18@School untuk Pendidikan Kenegaraan dan Demokrasi kepada Belia 18-21 Tahun <i>Wan Rohila Ganti Wan Abdul Ghapar, Che Hamdan Che Mohd. Razali, Muhamad Fazil Ahmad &amp; Abdul Rahman Abdul Latip</i>	28
7.	A Planning of Templer Forest Park and Templer Forest Reserve through Management Plan <i>Mohammad Zharif Hakimi Mohammad Mazani, Nurul Atikah Mohd Salleh, Muhammad Hafiy Safwan Sahak, Nurul Nabila Che Ahamed, Teeny Valerian, Mohamad Fathi Radhi Ishak, Nor Hanisah Mohd Hashim &amp; Firdaus Chek Sulaiman</i>	33
8.	Administrative Model for Sekolah Agama Rakyat (SAR): Excellence Practices <i>Mohd Nasir Ayub, Nazmi @ Nazni Noordin, Mohd Zool Hilmie Mohamed Sawal &amp; Surita Hartini Mat Hassan</i>	38
9.	ADR-Now Application: Bridging Theoretical and Practical Approach in Alternative Dispute Resolution Process and Procedures <i>Dr. Shahrizal Mohd Zin, Abdul Mu’iz Abdul Razak, Prof. Madya Dr. Nur Ezan Rahmat &amp; Nik Hasbi Fathi</i>	43

10. Agricultural Career Training Program for Drop Out Students through Work Based Learning 47  
***Marinah Muhammad, Noor Janatun Naim Jemali, Nik Raihan Nik Yusoff & Rozidaini Mohd Ghazi***
11. An Eco-Friendly Concrete Blends from Palm Oil Boiler Ash 52  
***Nurrul Amilin Zainal Abidin, Zeno Michael, Mohamed Khatif Tawaf Bin Mohamed Yusof, Azmi Roslan, Siti Shahidah Binti Sharipudin, Shahrul Nizam Bin Mohammad & Ilya Izyan Binti Shahrul Azhar***
12. An Investigation of Clothing for Elderly: Emphasizing Safety, Protection and Functional Attributes 57  
***Shahrizad Fitri Mustapha, Shuhaila Nahrawi, Rizal Azni Dahaman & Norzaleha Zainun***
13. Ardu-Electrochromic Film for Home Safety And Privacy Purpose 65  
***Anas Akasyah Abd Patas, Nur Athirah Mohd Taib & Syahida Suhaimi***
14. Let's Talk about the Movies: The Movie Journal 71  
***Associate Profesor Dr Norwati Binti Hj Roslim, Associate Profesor Dr Hj, Muhammad Hakimi Tew Abdullah, Ku Nurul Atiqah Ku Ahamad, Nur Faathinah Mohammad Roshdan, Suhaila binti Sharil & Siti 'Aishatul-Humairah Muhammad Fisol***
15. Asymmetric Impact of The Oil Price Changes on Stocks Market for Selected Asean Countries 78  
***Shahiszan binti Ismail, Prof. Madya Dr. Noor Zahirah Mohd Sidek, Fauziah Mohamad Yunus, Jamilah Laidin & Nor Azira Ismail***
16. Automated System for Concrete Damage Classification Identification Using Various Classification Techniques in Machine Learning 81  
***Nur Haziqah binti Mat, Athifa Aisha binti Ahmad Zahida, Siti Nurhaliza binti Abdul Malik, Nur Athirah Syuhada binti Azmadi & Syahrul Fithry bin Senin***
17. Automatic Price Scanning System 88  
***Fahmi Nazreen Zakuan, Anis Diyana Rosli & Nurlida Ismail***
18. Al Hijjaei V1 94  
***Yuslina Mohamed, Mesbahul Hoque, Sulaiman Ismail Nurhasma & Muhamad Saad***
19. Infographic of Benevolence Practices: Public Sector's Myth or Reality 100  
***Dr Nor Zaini Zainal Abidin, Azni Syafena Andin Salamat, Syahrini. Shawalludin, Azlan Abdul Rahman & Dr Siti Norfazlina Yusoff***
20. BIO-CHEM KIT: Understanding Biogeochemical Cycles 104  
***Nurul Hidayana Mohd Noor, Shawal Sahid Hamid@Hussain, Mahazril 'Aini Yaacob & Mohd Hafiz Hazwan Hashim***

21.	Biodegradable and Recycle Husk Mailer from <i>Cocos nucifera</i> <i>Anas Firdaus bin Zakaria, Nur Atirah binti Hamzah, Siti Farahin binti Abdull Patah, Wan Zuraida Wan Mohd Zain &amp; Nur' Amira binti Hamid</i>	110
22.	Bunny's Pellet: Natural Mulberry Pellet <i>Nor Dini Rusli, Khairiyah Mat, Hasnita Che Harun, Mohd Mahmud &amp; Syed Muhammad Al-Amsyar Syed Abd. Kadir</i>	114
23.	Cails Paper Wash <i>Aisyah Nur Izzah binti Azhar, Intan Nafissa binti Mohd Jaffri, Loris Anak Noh, Caroline Anak Kiroh &amp; Silverina Anabelle Kibat</i>	120
24.	Capcut <i>Dr Sharifah Shafinaz Sh Abdullah, Nur Afini Azwa binti Roslan, Nur Alya Nabila binti Ashariman, Nur Mazmira binti Mohamad Zuki &amp; Nur Nabila binti Omar</i>	124
25.	Regenerated Kenaf Core Cellulose Hydrogels and Films Prepared via Pre-Cooled Method <i>Adam Khairul Faiz, Muhammad Khairil Hakim Ismail, Hatika Kaco &amp; Mohd Shaiful Sajab</i>	128
26.	Encapsulation of Winged Termites in Cellulose Nanofibre for the Fabrication of Cellulose Bioplastic <i>Syahidatul Nadhilah Shah Lail, Noorul Jannah Aizul Hussin, Hatika Kaco &amp; Mohd Shaiful Sajab</i>	134
27.	Chinese Character Card Game: Learners' Attitudes and Motivation <i>Ting Hie-Ling</i>	140
28.	Coffee Capsule Vending Machine <i>Mohd Sufian Ramli, Siti Sufiah Abd Wahid, Muhammad Hasif Razak &amp; Muhammad Hakimi Md Said</i>	146
29.	Corn-Based Bioplastic as Seedling Bag <i>Nur Nadia Nasir &amp; Siti Amira Othman</i>	151
30.	Coupiers: Course Pre-Registration System <i>Zeti Darleena Eri, Mohd Hanapi Abdul Latif, Mohd Atif Ramlan, Ruhana Jaafar, Sharifah Nurulhikmah Syed Yasin, Hasiah Mohamed &amp; Sarah Yusoff</i>	156
31.	Divorce Protection Takaful <i>Siti Thaqifah Ruzaidy, Siti Adibah Embong, Mohammad Firdaus Mohammad Hatta &amp; Arlinah Abd. Rashid</i>	162
32.	Entrepreneurial Website Project "Www.Businessletter4you.Com" <i>Akmal Syaifudin bin Kaharudin, Siti Zuraina binti Gafar @ Abd Ghaffar &amp; Juritah Misman</i>	168



44. Waste Segregation through Recycle and Composting Activities among the Community in Urban and Suburban Areas 225  
***Ts. Dr. Norhafezah binti Kasmuri & SitiNurhafizah binti Abdull Razak***
45. Ez-Crutches 2.0: An Innovation of Assistive Device for Disabled Person 231  
***Suzana binti Yusof, Sharifah Shafinaz binti Sharif Abdullah, Fatimah binti Sham & Norhafizatul Akma binti Shohor***
46. Facile-Fabricated Foamed Geopolymer Sphere for Heavy Metal Removal from Wastewater 236  
***Tan Tee How, Mo Kim Hung, Lai Sai Hin & Ling Tung-Chai***
47. Finance and Me (*FinME*) – A Digital Learning Tool 242  
***Carolyn Ann Enchas, Shafinaz Lyana Abu Talib, Fatin Adilah Razali & Norizuandi Ibrahim***
48. Fun with Mathematic and Origami: Water Lily Origami 246  
***Masnira Ramli, Wan Nurul Husna Wan Nordin, Amirah Sa'at & Nurul Fazila Lakasa***
49. Fund for Food: A Campus Food Pantry Toolkit to Help Fight Hunger on Campus 252  
***Nurul Hafizah Mohd Yasin, Nurhaiza Nordin, Nurnaddia Nordin, Nik Noorhazila Nik Mud & Siti Zamanira Mat Zaib***
50. Edible Cookie Cup: Cuppa Cookie 257  
***Raja Nur Hanisah Binti Raja Zainal Alam Shah, Nur Liyana A'tifah Binti Ahmad Jamalulail, Nur Farah Aqilah Binti Mohd Akram, Amara Nazirah Binti Mohd Yusoff & Noorshaadah Binti Omar***
51. GTNLARM21 262  
***Ts. Dr. Sharifah Shafinaz binti Sh Abdullah, Assoc. Prof. Ts. Dr. Zulkifli bin Mohamed , Aisyah Fitriah binti Asmala , Nur Fatimah binti Hanif & Nur Hanisah binti Mahadi***
52. Gulali Pandan 267  
***Amelia binti Zaidan, Ainul Hayati binti Abdull Aziz, Nurul Syamilah binti Ismail, Noristisarah Abd Shattar & Siti Noraisah Dolah***
53. Hill Paddy Plough 272  
***Jasrio Liugan, Sainah binti Melulin, Zurhizainih binti Halledy & 'Umairah Abd Khalid***
54. Historic Interior Scheme (HIS) Conservation Framework for Heritage Museum Building in Malaysia 275  
***Norashikin Abdul Karim, Siti Norlizaiha Harun, Salwa Ayob & Zulkarnain Hazim***

55.	I-Poket Perumahan: Panduan kepada Newbie <i>Mahazril 'Aini Yaacob, Nurul Hidayana Mohd Noor, Hafizah Hammad Ahmad Khan, Zuraini Yaacob &amp; Farah Amirah Fuad</i>	283
56.	Development of HVAC Virtual Laboratory (HV-Lab Version 1.0) <i>Mohd Faez bin Zainol, Ts. Shikh Ismail Fairus bin Shikh Zakaria &amp; Dr. Muhammad Zulkarnain</i>	287
57.	i-Care2u: Easy-To-Use Application Software to Enhance Knowledge and Awareness of Malaysians towards the Rights of Persons with Disabilities <i>Muhammad Fikri Othman, Nur Ezan Rahmat, Norazlina Abdul Aziz, Nora Abdul Hak &amp; Diyana Kamarudin</i>	293
58.	Immersive Learner's Usability and Experience through VMMBG during Covid-19 Pandemic: An Evidence of a Higher Educational Institution <i>Shahreena Daud, Idris Osman, Zarinah Abu Yazid, Norraeffa Md Taib &amp; Amirudin Mohd Nor</i>	297
59.	VCDDT: The Virtual Classroom Debate Tutorial Approach <i>Azlyn Ahmad Zawawi, Junaida Ismail, Irwana Nooridayu Mohd Hakimi Noorayuni Rusli &amp; Intan Syahriza Aziz</i>	304
60.	Indikator Teknik Pengajaran Bahasa Arab di UiTM Menerusi Teknologi <i>Nurul Asma Mazlan, Suhaila Zailani @ Ahmad, Zamri Arifin, Mohd Faizulamri Mohd Saad &amp; Nur Aqilah Norwahi</i>	307
61.	Inquiry-Based Reciprocal Teaching Module <i>Ting Pick Dew, Suyansah Swanto &amp; Vincent Pang</i>	311
62.	Instant Beef Stew <i>Nursyadah binti Nordin, Norhidayah bt Abdullah &amp; Muna Shakirah bt Mohamad</i>	316
63.	Integrated Solar-IoT Monitoring and Predictive Maintenance Systems for Irrigation (S-IoTP) <i>Hasyiyya Karimah Adli, Ku Azmie Ku Husin, Khairul Nizar Syazwan Wan Salihin Wong &amp; Muhammad Akmal Remli</i>	320
64.	IOT Based Monitoring System for Oyster Mushroom Farming Pondok Seri Permai Pasir Putih Kelantan <i>Muhd Azhar Bin Zainol, Sh Mohd Firdaus Bin Sh Abdul Nasir, Nor Suhada Binti Abdullah, Koay Mei Hyie, Siti Nur Amalina Binti Mohd Halidi, Hazimi Bin Ismail &amp; Lesairuamin Bin Leiah</i>	325
65.	IoT Based Water Leakage Monitoring System <i>Muhammad Azfar Shazmi Mohd Adnan &amp; Zulkifli Mohamed</i>	334
66.	i-Tabung <i>Dayang Aniisah Mardhiyyah binti Abg Borhanuddin, Mohamad Nornashriq Irfan bin Nordin, Muhammad Akram bin Nazri, Muhammad Azwar Naim</i>	340



***bin Amilan, Muhammad Fadhillah bin Mohd Zam Zam, Mohd Fazly bin Mohd Razali & Ima Ilyani binti Dato' Hj. Ibrahim***

- |     |   |     |
|-----|---|-----|
| 67. | Kaedah Pengajaran CHM510: Dari Sudut Pandang Pelajar<br><b><i>Sheikh Ahmad Izaddin Sheikh Mohd Ghazali, Nur Nadia Dzulkifli, Nor Monica Ahmad, Jamil bin Mohamed Sapari, Ahmad Husaini Mohamed &amp; Nurul Nadthira binti Che Awang</i></b>   | 343 |
| 68. | Ke Arah Kelestarian Kebun Komuniti dalam Usaha Menyantuni Golongan B40<br><b><i>Intan Syafinaz Mat Shafie, Yuslina Liza Mohd. Yusof, Nor Irvoni Mohd Ishar, Maryam Jameelah Mohd Hashim, Mohd Fairus Kholid, Muhammad Yasin Ramadhan Zahari &amp; Sharidatul Akma Abu Seman</i></b> | 348 |
| 69. | Uniquecare Takaful<br><b><i>Muhammad Sa'di Bin Mohd Saman, Nur Aimi Binti Abdul Azis, Mohammad Firdaus Bin Mohammad Hatta &amp; Azlina Binti Hanif</i></b>  | 353 |
| 70. | #Kitajagakita: The Manifestation of Modern Jewellery Design<br><b><i>Mohd Faiz Jalaludin, Mohd Hakim Mohd Sharif, Adib Mohd Hasan &amp; Muhammad Shafiq Muda</i></b>  | 359 |
| 71. | Kombu-Feed: A Nutritive & Prophylactic Alternative for Fish Production<br><b><i>Ruhil Hayati Hamdan, Tan Li Peng, Nora Faten Afifah Mohamed, Ain Auzureen Mat Zin &amp; Ahmad Syazwan Samsuddin</i></b>   | 363 |
| 72. | Kriging Interpolated Rainfall Data in ArcGIS for a Sustainable Flood Modelling Prediction<br><b><i>Fahda Nurhani Ahmad Razan, Nur Fatim Nasuha Mhd Khatif &amp; Ir. Nur Azwa Muhamad Bashar</i></b>   | 368 |
| 73. | Kuasai Rintas: Penulisan Ringkasan Bahasa Melayu Yang Lengkap<br><b><i>Gladys Sebi binti Entigar, Noor Haty binti Noor Azam, Milfadzhilah binti Mohd Jamil, Roziana binti Ahmed &amp; Nur Elimtiazi bin Abidin</i></b>  | 373 |
| 74. | Landscape Architecture Design Studio-Based Using Process-Evaluation Model in Open Distance Learning<br><b><i>Masbiha Mat Isa, Alamah Misni &amp; Faridatul Akma Ab Latif</i></b>  | 378 |
| 75. | LiBCO<br><b><i>Noryana binti Ahmad Khusaini, Nur Hasni binti Nasrudin, Mohd Shamsul bin Daud, Noraini binti Abd Rahman, Rosida binti Ahmad Junid &amp; Siti Fairuz binti Ibrahim</i></b>  | 382 |
| 76. | Limit of Acceptable Change and Recreation Opportunity Spectrum as a Tool in Developing a Management Plan. A Study in Templer Forest Eco Park & Templer Forest Reserve   | 388 |

	<b><i>Syahidah Hanani Hamdan, Nur Sabrina Sabri, Muhammad Hazim Zakaria, Khairul Asri, Syanizatul Izreen Kamal, Nor Asma Safuraa Roslan, Ely Rouzee Jamaluddin &amp; Nawfal Kamarul Bahrain</i></b>	
77.	Tweet It! EsL Writing Activity Module Using Twitter <b><i>Nurshahirah Azman &amp; Zaemah Abd Kadir</i></b>	393
78.	Malaysian Secondary Boarding School Menu Planning System <b><i>Suliadi F. Sufahani &amp; Anuar M. Yusof</i></b>	399
79.	Malaysian Studies Pocket Read <b><i>Ani Juaini Bahrin, Farhana Yaakub, Firdausi Sufian (Dr), Nurfaizah Abdullah &amp; Saiful Zizi Jalil</i></b>	405
80.	Mathematical Thinking Enhancement Program (MaTh-EP) <b><i>Nurul Akmal Md Nasir, Parmjit Singh &amp; Geethanjali Narayanan</i></b>	410
81.	Medicine Reminder With Low Battery Alert “MEDMINDER” <b><i>Syahirah Asyiqin Binti Alias, Luqman Hakim Bin Fazilah Shuhaimi, Khairin Farhana Binti Kharul Anuar, Muhammad Firdaus Bin Mangsor &amp; Suhana Sulaman</i></b>	418
82.	Meow-Meow Food Dispenser Using Internet of Things (IOT) Programme <b><i>Nor Diyana Md Sin, Saifaris Azizi Saiful Azam, Muhamad Danial Osman, Mohamad Zhafran Hussin, Norbaiti Sidik, Khairul Kamarudin Hasan</i></b>	424
83.	Mesin Penapis Turpentin Turpentine Filter Machine (TFM) <b><i>Hairulnisak binti Merman, Muhammad Salehuddin bin Zakaria, Aiman Yusri bin Mohamad Yusoff, Aimi Atikah binti Roslan &amp; Azian binti Tahir</i></b>	429
84.	Mind Your Right Booklet: Awareness on Cyber Defamation Law & Media <b><i>Suria Fadhillah Md Pauzi, Musramaini Mustapha, Azniza Ahmad Zaini, Suhanom Mohd Zaki &amp; Mohd Aidil Riduan Awang Kader</i></b>	434
85.	Modelling the Effectiveness of Using Online Food Delivery Services Apps Among Customers in Klang Valley During Covid-19 Pandemic <b><i>Prof Madya. Dr Rozita Naina Mohamed, Mohd Saifullah Bin Rusli &amp; Prof.Madya. Dr.Halimahton Borhan</i></b>	440
86.	The Innovation Process Modelling for Ethanol Gas Sensing Using Artificial Neural Network <b><i>Muhammad Afiq Wazini bin Jemani, Vicinisvarri Inderan, Syahrul Fithry bin Senin, Norain Binti Isa &amp; Lee Hooi Ling</i></b>	447
87.	The Effectiveness of i-Lab v2 as a Teaching Tool for Online Distance Learning <b><i>Nur Zaidani Wati binti Mohd Darwis, Noor Raifana binti Ab Rahim, Narita binti Noh &amp; Juwita binti Asfar</i></b>	453

88.	My Ecredit Banking Apps (MECBA) V3 <i>Wan Razazila Wan Abdullah (Dr), Enny Nurdin Sutan Maruhun (Dr), Norzarina Nordin, Sunarti Halid &amp; Ahmad Saiful Azlin Puteh Salin (Prof. Madya Dr)</i>	459
89.	The Dynamics of MILO (Multimedia Interactive Learning Online) in Role Playing: Enhancing the Learning Process in Covid-19 Pandemic <i>Woo Pak Yuan, Nina Farisha binti Isa &amp; Ezwani Azmi</i>	464
90.	The Continuance of External Review Information System Adoption In Malaysia <i>Mohd Norafizal Abd Aziz, Razulaimi Razali, Nik Rosli Abdullah &amp; Shahrul Azam Abdullah</i>	470
91.	Understanding Islamic Finance Concepts through Innovative Game: Name The Riba Transaction! <i>Azilawati Banchit, Puteri Faida Alya Zainuddin &amp; Lai Tze Wee</i>	479
92.	Natmag Cleaner (Natural Magnificent Cleaner) <i>Hani Hasriena binti Hasrin, Muhammad Firdaus bin Ahmad Nizam, Nur Amalin Batrisya binti Ujud, Deeny Robeatul Adawiyah binti Khairul Anuar &amp; Norzalina binti Jenal</i>	484
93.	New Fundamental Theory in Solving the Royalty Payment Problem <i>Wan Noor Afifah binti Wan Ahmad &amp; Suliadi Firdaus bin Sufahani</i>	489
94.	Notebookly (A Pageless Notebook) <i>Aimi Natasha binti Rujha, Amani binti Mohamad Soree Awankasim, Muhammad Faiz bin Abdul Hamid &amp; Nur Dania Syahirah binti Mohd Asri</i>	492
95.	Nutritious Digital Menu System for Malaysian Religious Primary School Children: Improving Good Memories <i>Azila M. Sudin, Suliadi F. Sufahani &amp; Mohd A.A. Abdullah</i>	495
96.	Online Games for Learning Lewis Structure <i>Wan Elina Faradilla Wan Khalid, Tuan Sarifah Aini Syed Ahmad, Nor Akmalazura Jani, Rohaiza Saat &amp; Nurazira Mohd Nor</i>	501
97.	Optimal Charging Schedule of Electric Vehicles Using Evolutionary Programming to Minimise Costs <i>Hasmaini Mohamad, Norhasniza Md Razali, Ahmad Farid Abidin, Nur Ashida Salim &amp; Zuhaila Mat Yasin</i>	506
98.	The Smart Attendance of Microsoft Team (SAMT 2021) in an Online Learning Classroom <i>Wan Normila Mohamad &amp; Zahari bin Md Rodzi</i>	511
99.	Penelitian Terhadap Kepelbagaian Fungsi Bandar Kecil Terhadap Penduduk Setempat di Gemas, Negeri Sembilan <i>Natasya Farhana Nazry, Jabil Mapjabil &amp; Farzanna Yashera Abdulla</i>	521

- |      |   |     |
|------|---|-----|
| 100. | Penentuan Kaedah Mengukur Kesanggupan Untuk Membayar (WTP) Dalam Pelancongan<br><i>Nabila Farysha Dering &amp; Jabil Mapjabil</i>   | 525 |
| 101. | Penentuan Kecenderungan Tingkah Laku Pelancong yang Berkunjung ke Kota Kinabalu – Psikosentrik dan Alosentrik<br><i>Farzanna Yashera Abdulla , Jabil Mapjabil &amp; Natasya Farhana Nazry</i>   | 531 |
| 102. | Penentuan Kuasa Beli Pengunjung terhadap Perkhidmatan Pelancongan Terpilih di Bandaraya Kota Kinabalu, Sabah<br><i>Nurul Izzah Ismail &amp; Jabil Mapjabil</i>  | 535 |
| 103. | The Artificial Neuron Network for Photocatalytic Degradation of Acid Orange 7 Using Cerium Oxide (CeO <sub>2</sub> )<br><i>Wan Nur'ain Awanis binti Wan Sa'ari, Vicinisvarri Inderan, Syahrul Fithry bin Senin &amp; Nur Fadzeelah Abu Kassim</i> | 539 |
| 104. | Perception of Digital Reading Material for Academic Purposes among UMK Undergraduates<br><i>Noor Syamimie Mohd Nawi, Lena Ramamurthy, Syakirah Shafien, Suhaida Omar &amp; Nik Ahmad Farhan bin Nik Azim</i>                                      | 544 |
| 105. | Perception of Language Awareness through Framagram: A Classroom Example<br><i>Nik Ahmad Farhan bin Azim @ Nik Azim, Lena A/P Ramamurthy, Syakirah binti Shafien, Noor Syamimie binti Mohd Nawi &amp; Shahidatul Maslina binti Mat So'od</i>       | 548 |
| 106. | Perkasa @ Aps : Solusi kepada Kerapuhan Keluargayang Mempunyai Anak Cerebral Palsy<br><i>Wan Rohila Ganti binti Wan Abdul Ghapar, Muhamad Fazil Ahmad, Norhashimah Yahya &amp; Rahaya Mat Jamin</i>   | 552 |
| 107. | Poket Peka Undang-Undang Dilettante V2:Pemberhentian Kerja<br><i>Suria Fadhillah Md Pauzi, Muhammad Asyraf Azni, Suriyati Ujang, Azniza Ahmad Zaini &amp; Ida Rosnita Ismail</i>  | 556 |
| 108. | Power Generation Using Thermoelectric Power Generator with Parabolic Solar Concentrator<br><i>Aneurin Nanggar anak Nyandang, Ir. Dr. Ts. Baljit Singh A/L Bhathal Singh &amp; Dr. Muhammad Fairuz bin Remeli</i>                                  | 562 |
| 109. | Prediction of Nanostructure of SnO <sub>2</sub> Properties Using Artificial Neural Networks<br><i>Khadijah binti Mohd Suhami, Vicinisvarri Inderan, Syahrul Fithry bin Senin &amp; Lee Hooi Ling</i>  | 565 |
| 110. | Product Development - e-Ta'awun PA Takaful+<br><i>Mohd Faizan bin Mohd Afandi, Norazrisham bin Shamsuddin ,Muhamad Izmul Nizam bin Zubairi , Mohammad Firdaus bin Mohammad Hatta &amp; Mohamad Nizam bin Jaafar</i>                               | 570 |

111. Promoting Malayan Emergency State by Using Gaming Platform as An Illustrative Medium 577  
***Mohammad Nor bin Anwar Hussin***
112. ProTecME 583  
***Rosuzeita Fauzi, Syazwan Firdaus Abu Bakar, Roslinda Isa, Siti Nor Ismalina Isa, Diana Tasha Mohd Nazeri***
113. Protein as the Building Blocks of Life 587  
***Rania Farzana binti Azmi, Azleen Nurkarmilya binti Azami, Nur Shafinaz binti Mohamad Salin & Wan Mazlina Md Saad, PhD***
114. Pull Up Crisp Container 589  
***Mohamad Firdaus bin Shaari, Kamarul Asyraf bin Shamsudin & Nurul Fatimah binti Mohamad Azmi***
115. RE Protect-i 592  
***Mohd Azeem bin Ahmad Zaini, Farid Akmal bin Fadzli, Mohd Saiful Izzat bin Mat Zahari, Wahida binti Ahmad & Mohammad Firdaus Mohammad Hatta***
116. ReProDB Web Application (Research Project Database) 598  
***Jennifah Nordin, Afida Arapa, Ibiannaflorinciliana Niane Anthony Aning & Intan Syahriza Azizan***
117. Rizbrunana: Advances in High-Fibre Biscuit Using Brown Rice and Banana Peel 609  
***Nurul Hafizah Mohd Yasin, Derweanna Bah Simpong, Nur Farihin binti Abd Hadi Khan & Mazne Ibrahim***
118. Ready-To-Bake (RTB) Cookie Dough 615  
***Muna Shakirah Bt Mohamad, Norhidayah Bt Abdullah & Nursyadah Bt Nordin***
119. RTGreenmFUND: Sejauhmanakah Keberkesanannya dalam Pengurusan Dana Ruang Terbuka Hijau Bandar 618  
***Nabilaa Mohamed, Thenmolli Vadeveloo, Zarina Mohd Zain & Roni Ekha Putera***
120. TCD (Table Connector Design) 622  
***Ramlan Mustapha, Maziah Mahmud, Surita Hartini Mat Hassan, Siti Norma Aisyah Malkan & Nurul Hidayah Che Hassan***
121. Self-Practice Ringkasan (SPRing): An Innovative Mobile Apps for Self-Practice 629  
***Asmahani Mahdi, Zubaidah Bohari, Abdul Hadi Abdul Talip, Nurul Lizzan Kamarudin & Zainon Haji Bibi***

122. Revitalising Heritage Shophouses of Kota Bharu Kelantan 633  
***Yasmin Mohd Faudzi, Najah Md Alwi, Nor Hafizah Anuar, Juliza Mohamad & Nik Nurul Hana Hanafi***
123. Smart 3-Wheel Bike “Empower Disabled Entrepreneurs With Technology” 638  
***Nurnaddia Nordin, Nurhaiza Nordin & Nur Ilyana Amiira Nordin***
124. Takaful Sinar Ihsan Plus 642  
***Nur Adibah binti Ab Aziry, Erlyn Marlina binti A.Rahman, Nurul Izzaty binti Mohamad Ridzuan & Mohammad Firdaus Mohammad Hatta***
125. Smart Keychain 648  
***Mohd Hifadzly bin Husrin, Adeylson Ray Douni, Muhammad Azlan bin Moh Sali & Edrin Rosley***
126. Secured Multi Door Access System as A Web Application 652  
***Nor Shamshillah Kamarzaman, Norhayati Abdul Jamil, Noraliza Azizan, Jaaz Suhaiza Jaafar & Muhamad Syafiq Ahmad Nazri***
127. Standard of Care Framework for Occupier During Pandemic Covid-19 (SOCO): A Facilitation for Understanding Law Relating to Tourism Industry 657  
***Mohamad Sahizam Musa, Suria Fadhillah Md Pauzi, Shamsinar Abdul Rahman, Mohd Azim Zainal & Ida Rosnita Ismail***
128. Development Of Sound System Level Tools “SoQMeT” 664  
***Muhammad Danial bin Abu Hanafiah, Muhammad Aleef bin Mohamad Yaziz, Muhammad Aiqal bin Mohd Sazali, Adhilla binti Ainun Musir, Nurulzatushima binti Abdul Karim & Daliah binti Hasan***
129. Stackable Pinewood Pallet Storage Keeper (SPPiKe) 670  
***Nurrohana Ahmad, Hazlin Hasan, Sharifah Norhuda Syed Wahid, Mohd Aidil Riduan Awang Kader & Mastura Mohamad***
130. Sustainable Hybrid G-W Filter 676  
***Nur Fatin Nasuha Mhd Khatif, Fahda Nurhani Ahmad Razan, Ir. Nur Azwa Muhamad Bashar & Nurakmal Hamzah***
131. Takaphone Takaful 681  
***Muhammad Waizzulhakim bin Othamannor, Mohd Mazwan bin Mohd Jamil, Mohammad Firdaus bin Mohammad Hatta & Sharifah Faigah binti Syed Alwi***
132. Stay@Rural Application 686  
***Muhammad Faezzul Farhan bin Yazid, Muhammad Hakim Zulqarnain bin Ajis, Mohamad Sazlyzam bin Ledei Dawin@Salim Dawin, Mohd Ashnawi bin Ab Gani & Dr. Spencer Hedley Mogindol***

133. Sajadah Pillow 689  
*Nor Asyiqin Nadhirah binti Roslee Afendi, Sharifah Hafiza binti Abu Bakar, Nur Khaleqa Izzah binti Ikmal Hisam & Siti Hajar binti Md Shahar*
134. Pepper Casenitizer 693  
*Nurfatihah Syahirah binti Zaidi Rahimy, Syahira Nisha Nabila binti Mohamad Shahril, Muhammad Afiq Syahmi bin Rosli, Nur Wani Syamimi binti Yaman & Alvin Gatu*
135. My\_Watch - Changing the Way We Use Watches 699  
*Nur Athilla binti Alimin, Nur Hadirah Faqihah binti Zainudin, Siti Nadiah Afiqah binti Suhairi, Joseph Joshua Rumpungan Jr & Adrianna binti Aziz*
136. Myeco Application 704  
*Izz Fitri bin Hairul Sham, Nur Syahirah binti Dzulkarnain , Rosseryn Soubin Lonsiong & Siti Zuraini binti Ramley Alan*
137. Multipurpose Pushcart 709  
*Farah Adlyna Yeoh , Noor Zizy Ameleena binti Jailani , Nur Amiratul Atiqah binti Nur Azli Yaacob & Sairah Saien*
138. Multipurpose Handle Stabilizer – To Help You Handle Your Life 714  
*Nur Athilla binti Alimin, Nur Hadirah Faqihah binti Zainudin, Siti Nadiah Afiqah binti Suhairi, Joseph Joshua Rumpungan Jr & Adrianna Aziz*
139. The Travel Amenity Pod 719  
*Wan Nuramalin binti Wan Hussin, Nur Alissya binti Nazri, Muhammad Takbir bin Arifuddin & Ahmad Fareez bin Yahya*
140. Toothbrush 2-In-1 724  
*Alice Evana Anak Robert, Latijah Obaun, Staffy Stephen & Christy Bidder*
141. Torch Bottle 727  
*Muhammad Shazwan Puzi, Farzana Suaidah binti Suzaini, Nurul Aina Balqis binti Mohd Khairul Anuar & Nur Murniza binti Mohd Zaidi*
142. Tourism Application - Touch 731  
*Siti Hafizah binti Dzulkarnain, Amira Naqiyyah binti Mustaffa Ma'arof , Nursyahidah binti Hamzah, Nur Hidayah binti Mohammad Hazlan & Boyd Sun Fatt*
143. Locallah 736  
*Muhammad Faliq Aizat M.Amran, Nazmeen Fatima binti Istekhar Ahmad, Nur Izzati Nabilah binti Alias, Adriana binti Mohamad Faizal & Mohd Arsy Ardy bin Mohd Hardy*
144. Ez-Train Mobile App 741  
*Siti Aishah binti Sha'ari, Alirah Itor, Muhammad Faizzudin bin Mohd Shukor, Nur Hazeera binti Madehie & Nurafiqah binti Mohamad Musa*

145. Eventgo 747  
*Cassandra Grace anak Hamarah, Nazira Farahin binti Nazarudin, Venessa Kumang Amen anak Victor Luna & Cindy Johnny*
146. Duo-Bottle 752  
*Maybelyna Deborah Dick, Nurashikin Binti Hamzah, Jacqueline Henry & Nurafiqah Binti Mohamad Musa*
147. 4 In 1 Safety Kit 755  
*Nur Maisarah Afiqah binti Mazlan, Aina Afriena binti Afandi, Aida Najihah binti A.Lukman, Muhammad Irfan bin Mazlan & Nur Murniza binti Mohd Zaidi*
148. Augmented Reality Design: The Study of Property Development Marketing Tools 761  
*Norzaful Anuwar bin Ahmad Najamuddin*
149. SMART Hygiene Kit 765  
*Dg Kamisah Ag Budin, Jasmine Vivienne Andrew, Faiqah Mawardi, Mohammad Firdaus bin Mohamad & Dayang Haryani Diana Ag Damit*



## KRIGING INTERPOLATED RAINFALL DATA IN ArcGIS FOR A SUSTAINABLE FLOOD MODELLING PREDICTION

Fahda Nurhani Ahmad Razan  
School of Civil Engineering, College of Engineering,  
Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia.  
fahdanurhani2327@gmail.com

Nur Fatin Nasuha Mhd Khatif  
School of Civil Engineering, College of Engineering,  
Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia.  
fatinnasuha57@gmail.com

Ir. Nur Azwa Muhamad Bashar  
School of Civil Engineering, College of Engineering,  
Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia.  
nurazwa.bashar@uitm.edu.my

### ABSTRACT

Rainfall data is the most important input for a hydrological modelling especially for a flood prediction. Conventionally, the most common rainfall measurement using ground based data namely rain gauges networking from a certain catchment. Although rain gauge data measurement are relatively accurate, the estimated rainfall value were prone to errors. Alternatively, kriging has become a widely used interpolation method to estimate the spatial distribution of climate variables including rainfall value. The objective of this study is to evaluate the application of geostatistical (ordinary kriging) method for rainfall value improvement for Upper Klang River Basin (UKRB), Malaysia. The historical rainfall record from existing rain-gauge stations of UKRB in a Monthly basis (January 2019) was selected and be as an input to the kriging method. Ordinary Kriging with the gaussian variogram model produces the lowest prediction error for rainfall estimation. Thus, it is found to be the most accurate interpolator for estimating the monthly rainfalls over Upper Klang River Basin. This improved data is essential to be used as an input for sustainable flood prediction in the future to reduce the flood risk experience especially in the UKRB Catchment and other catchment that have a similar characteristic with this catchment. In addition, it could reduce the losses of property due to flood impacts and as one of the option for the sustainable flood planning, protection plan or rehabilitation work in the future.

**Keywords:** Error reduction, ordinary kriging, semivariogram model, rain gauge, flood prediction.

### INTRODUCTION

Accurate rainfall measurement is the key components of hydrological simulations because inaccurate measurement leading to inadequate design of hydraulic structures such as flood control structure. Error in rainfall input data are one of the most important sources of uncertainty in urban hydrological model because urban hydrology is characterized by fast runoff and short response time. The errors in the rainfall data applied in the calibration of hydrological models may cause poor simulations and erroneous flood forecasting results (Liu et al., 2018). However, rain gauges are associated with errors namely instrumentation error (systematic errors and random errors) and data collection errors (missing data). The presence

of these errors contributes to the uncertainties in rainfall estimation mainly during extreme event like a flash flood. Uncertainties related to rainfall measurement error are high.

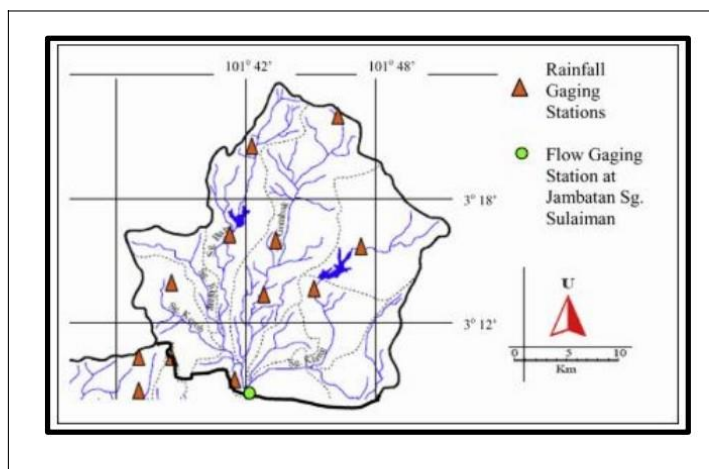
Rainfall values can be interpolated into deterministic interpolation methods (thiessen-polygon, inverse distance method and spline method) and geo-spatial method (kriging method). Ordinary kriging interpolation produces smooth surfaces and can evaluate the uncertainties by kriging variance providing a starting point to estimate rainfall uncertainty. It is also recommended in estimating areal mean rainfall on small catchment as the estimations are accurate. There are various factors in determining the best interpolation of rainfall data to accurately estimate rainfall. The characteristic of catchment area is the major factor. Understanding on data usage and on error reliability is important to rainfall estimation processing for a proper prediction and preparation of flash flood event for current and in the future. Furthermore, it is important as gauged precipitation data remain the basic reference to evaluate the performance of hydrological models with different precipitation inputs after from satellite or radar estimation so that the accuracy of rainfall data can be evaluated.

## MATERIALS AND METHOD

This study involves field based and computer based studies as mentioned in the following section.

### Rainfall Data Collection

Field based study involve rainfall data collection. Rainfall data of Upper Klang River Basin (UKRB) rain gauge stations were collected from Department of Irrigation and Drainage (DID), Ampang, Selangor. The collection involved monthly and hourly rainfall data for rain gauge namely January 2009. The chosen station comprised of eleven rain gauge stations to serves as a benchmark and ground truth of rainfall estimation. **Figure 1**, shows the Klang River Basin (KRB) and Upper Klang River Basin (UKRB). **Table 1**, shows the number of stations and name of the stations.



**Figure 1.** Upper Klang River Basin [Tahir et. al., 2009]

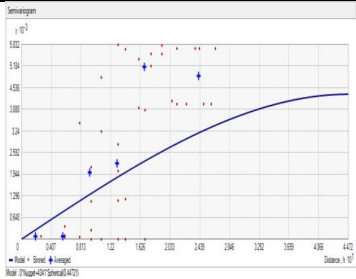
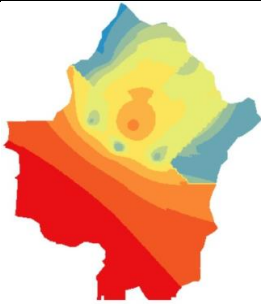
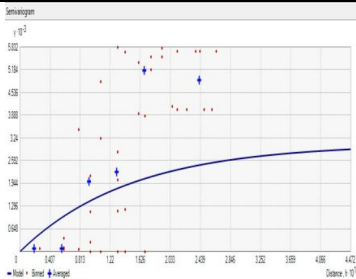
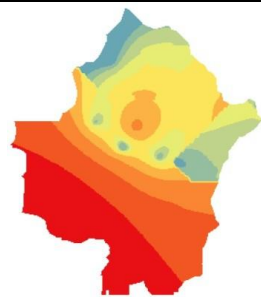
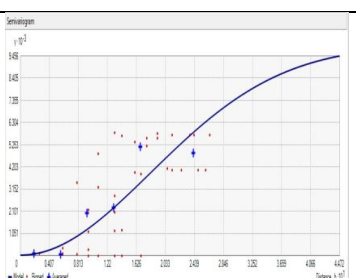

Station Number	Name of Stations
3114113	Segambut
3116003	JPS Wilayah Persekutuan
3116006	Ldg. Edinburgh Site 2
3216001	Kg. Sg. Tua
3217001	Ibu Bekalan Km. 16, Gombak
3217002	Empangan Genting Kelang
3217003	Ibu Bekalan Km. 11, Gombak
3217004	Kg. Kuala Seleh
3217005	Kg. Kerdas(This station shifted from Gombak Dam site)
3317001	Air Terjun Sg. Batu
3317004	Genting Sempah

## Research Methodology

The methodological framework for spatial interpolation of rainfall using kriging based geostatistical (Ordinary Kriging) interpolation method. This study involved the running of spatial analysis tool (kriging interpolation) with selected observed rain gauge data as an input into ArcGIS 10.8 software. Maximum monthly rainfall value were selected as an input in simulation of ArcGIS 10.8 using geostatistical wizard extension.. The monthly rainfall value was tested in kriging geostatistical method with three different variogram namely Spherical, Exponential and Gaussian model. The models performance were validated with Root Mean Square Error (RMSE).

The obtained results from the simulation were shown in **Table 2**.

**Table 2.** Ordinary kriging method for January 2013.

Models	Variograms	Kriging Interpolated Maps	Root Mean Square Error
<b>Spherical</b>			21.97
<b>Exponential</b>			19.83
<b>Gaussian</b>			17.16

**Table 1.** demonstrates the results of ordinary kriging application using geostatistical analyst tool extension from ArcGIS 10.8 software. The variogram model tested for the month January 2013 are Spherical, Exponential and Gaussian variogram. Ordinary kriging with Gaussian variogram has the best estimation producing the lowest prediction error with root mean square error of 17.16.

In this study, the aim is to apply for a two kriging-based stochastic interpolation methods for the estimation of monthly rainfall distribution in the Upper Klang River Basin (UKRB), Malaysia. Among the application, ordinary kriging with the gaussian variogram model produces the lowest prediction error for rainfall estimation. Thus, it is found to be the most accurate interpolator for estimating the monthly rainfalls over Upper Klang River Basin. In a nutshell, the kriging interpolated rainfall can be an alternative data in terms of reliable sustainable flood prediction in the future.

## ACKNOWLEDGEMENTS

Author would like to thanks School of Civil Engineering, College of Engineering, Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang for the facilities and support throughout the research activities. In addition, thanks to the Department of Irrigation and Drainage (DID) for the rainfall data supply used in this research.

## REFERENCES

- Liu, S., Li, Y., Pauwels, V. R. N., & Walker, J. P. (2018). *Impact of Rain Gauge Quality Control and Interpolation on Streamflow Simulation: An Application to the Warwick Catchment, Australia*. *Frontiers in Earth Science*, 5(January), 1–13.
- Tahir, W., Ibrahim, Z. & Ramli, S. (2009). Geostationary Meteorological Satellite-Based Quantitative Rainfall Estimation (GMS-Rain) for Flood Forecasting. *Malaysian Journal of Civil Engineering* 21(1) : 1- 16.



Cawangan Kedah  
Kampus Sungai Petani

Faculty of Administrative  
Science and Policy Studies

# i-SPiKE<sup>2021</sup>

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

*Leading An Artificial Innovation In Knowledge, Education And Design*

e ISBN 978-967-2948-20-9



9 7 8 9 6 7 2 9 4 8 2 0 9