



JPT DEPARTMENT OF HIGHER EDUCATION



MEIPTA



# IUCEL 2022

INTERNATIONAL UNIVERSITY CARNIVAL ON E-LEARNING

# INNOVATING EDUCATION FOR A BETTER TOMORROW

INTERNATIONAL UNIVERSITY CARNIVAL ON E-LEARNING (IUCEL)  
PROCEEDINGS 2022

**Innovating Education for A Better Tomorrow  
International University Carnival on E-Learning (IUCEL) Proceedings 2022**

eISBN 978-967-26517-1-0

© Centre for Academic Development (CADe), Universiti Putra Malaysia  
First Print 2022

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.

Book cover illustration and design: Muhammad Farhan Azmi

Published by  
Centre for Academic Development (CADe)  
Bangunan Canselori Putra  
Universiti Putra Malaysia  
43400 UPM Serdang, Selangor



03- 9769 6175



<http://www.cade.upm.edu.my>

## **Editorial Team**

Wan Marzuki Wan Jaafar, K.B.; P.A

Suriana Sabri

Dahlia Zawawi

Mohd Noor Hisham Mohd Nadzir

Yasminani Mohamad

Siti Khadijah Adam

Nurfadhlina Mohd Sharef

Mas Nida Md Khambari

Zakiah Ponrahono

Nadiya Akmal Baharum

Nur Aira Abd Rahim

Suriati Paiman

Nor Aniza Ahmad

Chong Chou Min

Ahmad Salahuddin Mohd Harithuddin

## Table of Contents

Preface	xvi
<b>1</b> TAKARAGASHI: The Educational Treasure Hunt Game <i>Muhammad Alif Redzuan Abdullah, Sanimah Hussin &amp; Mohd Zulkifli Ismail</i>	1
<b>2</b> Enhanced 6-E Framework: Integrating AR In Amplifying Architecture Students Learning Experience <i>Filzani Illia, Azim Sulaiman &amp; Nik Syazwan</i>	5
<b>3</b> Face Recognition in the Online Proctoring Exam System <i>Nor Omaima binti Harun, Mohd Hafriz bin Nural Azhan, Nordin Abd Rasid, Muhammad Ismail Afandi bin Muda, Nur Azira Jusoh, Khairul Bukhairi bin Abd Hamid &amp; Abdul Hadi bin Ismail</i>	9
<b>4</b> The Use of Chaoxing Learning Platform in Chinese Secondary Vocational Schools' English as a Foreign Language (EFL) Classroom <i>Qiu Chuane &amp; Siti Shuhaida Shukor</i>	15
<b>5</b> Kun Mumtazan UPKK <i>Norasyikin Osman, Hanun Khalida Mohd Aziz, Nur Farahana Mazlan, Nur Hasha Balqis Zakaria, Nor Fadziella Ain Jamaludin, Nur Sakinah Haziman, Nurul Atikah Mohd Rosli, &amp; Siti Salwa Mohd Noor</i>	19
<b>6</b> Pengajaran Dan Pembelajaran <i>Al-Qawaid Al-Fiqhiyyah (Islamic Legal Maxims)</i> Merentasi Teknologi <i>Zahari Mahad Musa, Mohd Nasir Abdul Majid, Mohamad Zaharuddin Zakaria &amp; Abdul Manan Ismail</i>	22
<b>7</b> e-Bijak (Brilliant Jawi and Khat) for Ujian Penilaian Kelas Kafa (UPKK) <i>Mahlindayu Tarmidi, Rusli Abdul Roni, Maizatul Akmar Mohd Rasli &amp; Wan Farhah Shafiy Wan Kamalluarifin</i>	26
<b>8</b> Islamic Mobile Game: Ramadan Spirit <i>Maisarah Binti Mohd Ramli &amp; Suhaili Binti Din</i>	30
<b>9</b> ResVAR (Respiratory Ventilatory Augmented Reality) Application: A Teaching and Learning Tool for Medical Students <i>Azmah Sa'at, Rahmita Wirza O.K. Rahmat &amp; Heba Ahmad Mahmoud Zahran</i>	35
<b>10</b> The Use of Yieldmax® Simulation as a Teaching and Learning Approach for Hotel Revenue Management <i>Shantini Thuraiselvam</i>	39
<b>11</b> Gamified Augmented Reality Application as a Learner Model for CNC Machining Course in TVET System <i>Nadia Abdul Rani, Faieza Abdul Aziz, Nalienaa Muthu &amp; Lai Lai Win</i>	44

<b>12</b>	A Virtual Extended Reality Learning Experience by Integrating Global Classroom Pedagogy Between Taylor's University Malaysia and Mae Fah Luang University Thailand <i>Lai Zee Wei &amp; Yap Wei Hsum</i>	48
<b>13</b>	Embarking on Adaptive Learning Using Lesson Activity and H5P Interactive Content <i>Umi Kalsom binti Masrom, Wan Farhah Shafiy binti Wan Kamalluarifin, Nor Yazid binti Khamis, &amp; Azwin Arif bin Abdul Rahim</i>	52
<b>14</b>	Kodular: Mobile Innovation Platform for Interactive Digital Learning <i>Nur Najahatul Huda Saris, Norazliani Md Sapari, Nurul Ashikin Daud, Nor Aishah Muhammad &amp; Noorhazirah Sunar</i>	56
<b>15</b>	Implementation Of CMap Tools as a Formative Assessment in Direct Current (DC) And Alternative Current (AC) Analysis <i>Norazliani Md Sapari, Nurzal Effiyana Ghazali, Nur Najahatul Huda Saris, Nor Aishah Muhammad, Noorhazirah Sunar, Nurul Ashikin Daud, Syahirah Abd Halim</i>	61
<b>16</b>	Mobile Application in Teaching of Magnetic Resonance Imaging (MRI) Safety Among Final Year Medical Students <i>Cheah Wai Hun, Norhasiza Mat Jusoh, Husbani Mohd Amin Rebutan, Azizah Abdul Ghani &amp; Myat Moe Thwe Aung</i>	65
<b>17</b>	Motivated Virtual Learning Experience with Peer Education Framework <i>Siok Yee Chan, Reem Abou Assi, Celina Huey Ru Yeo &amp; Zi Qing Yap</i>	69
<b>18</b>	Receptive Skills: Interactive Digital Textbook Aids Ahead <i>Lena Ramamurthy, Syakirah Shafien, Noor Syamimie Mohd Nawi &amp; Shahidatul Maslina Mat So'od</i>	73
<b>19</b>	The ARELE Project - An Augmented Reality Enhanced Learning Environment for Student Engagement <i>Nazi Mahendru &amp; Mai Neo</i>	79
<b>20</b>	Strengthening Online Education Through DIY Videos: The Heart of Digital Learning <i>Shiamala Devi Ramaiya &amp; Muta Harah Zakaria</i>	83
<b>21</b>	To Blend or Not to Blend? Creating Impactful Blended Learning Experiences for Indonesian Design Students <i>Lisa Indriati &amp; Neo Mai</i>	87
<b>22</b>	Teaching Online Made Easy: The 3Es (Effective, Engaging, & Efficient) with Collaborative Learning Tools <i>Vinothini Vasodavan, Dorothy DeWitt, &amp; Norlidah Alias</i>	91
<b>23</b>	Whiteboard to Lightboard: Why You Should Make the Switch? <i>Mohd Hafizal Ismail, Sheena Bidin &amp; Sam Shor Nahar Yaakob</i>	96
<b>24</b>	Realisation of Teaching Round During Lockdown 3.0 <i>Zainab Mat Yudin, Noraini Mohamad &amp; Wan Mohamad Nazlee Wan Zainon</i>	101

<b>25</b>	Cyberpoly: Cybersecurity Edugame <i>Sakinah Ali Pitchay, Anis Syahira Suhaimi, Najwa Hayaati Mohd Alwi, Farida Hazwani Mohd Ridzuan &amp; Azni Haslizan Ab Halim</i>	106
<b>26</b>	Learning Japanese Kana Characters Using Mobile Apps <i>Muhammad Alif Redzuan Abdullah &amp; Sanimah Hussin</i>	111
<b>27</b>	Contentpreneur: How Can Social Media Contentpreneurs (SMC) Monetize on Youtube? <i>Muhamad Fazil bin Ahmad</i>	115
<b>28</b>	Kamishibai Storytelling Technique Promotes Children’s Learning and Understanding on the Harmful Effects of Smoking Through Virtual Platform <i>Noor Afiza Abdul Rani, Balamurugan Tangiisuran, Nur Azzalia Kamaruzaman, Sulastri Samsudin, Maizurah Omar, Sazaroni Md Rashid &amp; Mohd Fadhli Razali</i>	120
<b>29</b>	BeeMsee an Educational Board Game for Business Model Canvas <i>Norhilmu Muhammad, Nur Izzati Ab Ghani, Farah Roslan, Nizaita Omar, Fazida Karim, Ismahafezi Ismail</i>	123
<b>30</b>	TKiMARA: The Kidney Mobile Augmented Reality Application, a Learning Aid for Medical and Health Sciences Students <i>Nurul Hayati Mohamad Zainal, Intan Nur Syuhada Abdul Halim, Nurul Huda Mohd Nor, &amp; Rahmita Wirza O.K. Rahmat</i>	128
<b>31</b>	Flip It! A Solution for Low Bandwidth Interactive Self-Paced Learning <i>Tan Li Peng, Ruhil Hayati binti Hamdan &amp; Ahmad Syazwan Samsuddin</i>	132
<b>32</b>	EcoXplorer V 2.0 <i>Muaz Azinuddin, Wan Mohd Adzim Wan Mohd Zain, Nur Shahirah Mior Shariffuddin, Ahmad Puad Mat Som &amp; Mohd Khairul Amri Kamarudin</i>	136
<b>33</b>	CommTastic Language Quiz Game <i>Saliana binti Sawaluddin, Nur Naimhafizah binti Ramli, Norazurawati binti Mohd Amin &amp; Ts. Dr. Ismahafezi bin Ismail</i>	141
<b>34</b>	Interactive Virtual Physiotherapy Objective Structured Practical Examination (OSPE) During Covid-19 <i>Lee Wan Zhen, Hanisah Binti Azahari &amp; Naresh Bhaskar Raj</i>	146
<b>35</b>	AR Kana: Memorize Japanese Kana Using Augmented Reality <i>Nursuhada Mohd Noor, Sumayyah Dzulkifly &amp; Nor Masharah Husain</i>	150
<b>36</b>	Interactive Hybrid Learning Model for Physiotherapy Course via Knowledge and e-Learning Integrated Platform (KELIP) <i>Hanisah Azahari</i>	155
<b>37</b>	“Gliding” Learning Using Mobile Study Guide: Design and Application Using the Glide App <i>Jasmine Jain, Mok Shu Jin &amp; Johan Eddy Luaran</i>	160

<b>38</b>	Value-Based Education in MPU4 Social Innovation Project <i>Zaim Azizi Abu Bakar, Fadhilah Raihan Lokman, Siti Noor Amyah Khasbullahr &amp; Serit Banyan</i>	162
<b>39</b>	Integration of Instagram in Visualization Project-Based Learning for Foodservice Operations Course <i>Salmalina Salleh, Lee Shih Hui, Noor Azean Atan, Salmaliza Salleh &amp; Nornazira Suhairom</i>	168
<b>40</b>	Micro-Credential: Introduction to Communication Network <i>Jehana Ermy Jamaluddin, Fazrena Azlee Hamid &amp; T.J. Iskandar Abdul Aziz</i>	173
<b>41</b>	E-Clinipractice: An e-Book on Practical Skills in Primary Care, Step-By-Step Approach with Demonstration Video <i>Nurul Azreen Yusof, Nur Aiza Idris, Norwati Daud, Nurul Izza Yunus &amp; Siti Norazlina Juhari</i>	177
<b>42</b>	Virtual Inabah (V-Inabah): A Digitised Educational-Cum-Therapy for Innovative Teaching and Learning in Pharmacy <i>Lua Pei Lin, Abdul Manam Mohamad, Mokhairi Makhtar &amp; Nurul Afiedia Roslim</i>	181
<b>43</b>	Upperlimbify: Augmented Reality Approach for Anatomy Learning <i>Nurul Huda Mohd Nor, Siti Fadziyah Mohamad Asri, Nur Haedzerafina Md Noor &amp; Rahmita Wirza O.K. Rahmat</i>	186
<b>44</b>	Online Learning Model for Psychomotor Domain Acquisition in Physiotherapy Course <i>Hanisah Azahari</i>	189
<b>45</b>	Teaching Basic Microbiology Laboratory Techniques Through e-Learning (STERILIZATX) <i>Mohamad Fhaizal Mohamad Bukhori, Mohd Aminudin Mustapha, Mohd Faizullah Rohmon, Raziman Imam Ghazali @ Razali &amp; Besar Ketol</i>	194
<b>46</b>	The Simulated Eye Drops: A Pharmacology e-Learning Pedagogy for UniSZA Medical and Pharmacy Students <i>Marwan Saad Azzubaidi, Uday Younis Hussein Abdullah &amp; Harmy Bin Mohammad Yusof</i>	199
<b>47</b>	ePortfolios for Music Composition Students in Higher Education Institutions <i>Camellia Siti Maya Mohamed Razali &amp; Marzelan Salleh</i>	204
<b>48</b>	Amalan Terbaik Pengajaran dalam Talian (Best Practices for Teaching Online) <i>Ahmad Nasir Mohd Yusoff, Mohamad Fazli Sabri, Johan Ismail, Rozihan Mohamed, Noralina Ali &amp; Mohd Razi Yaakob</i>	209
<b>49</b>	Enhancing Student Learning Experiences with Augmented Reality & Artificial Intelligence: Merlin's Playground <i>Neo Mai, Heidi Tan Yeen-Ju, Lee Chin Poo, Neo Tse Kian, Nazi Mahendru, Tan Yong Xuan, Ismat Zahra &amp; Ekerin Oluseye Michael</i>	214

<b>50</b>	e-Portfolio: Designing A Tool for Online Teaching & Learning <i>Yip Jinchí &amp; Vinod J. Nair</i>	220
<b>51</b>	Modifying the Theory of Planned Behaviour to Explain Student Engagement in Online Learning <i>Sarimah Suriashah, Suriani Hassan &amp; Shyafina Soleha Mohd Afendi</i>	224
<b>52</b>	Infographics in Teaching and Learning: An Attention Grabber <i>Azila Adnan &amp; Muhamad Fairus Noor Hassim</i>	227
<b>53</b>	Design Thinking Multidisciplinary Collaboration in a Virtual Reality Learning Environment <i>Mike Choong Wai Keng</i>	232
<b>54</b>	Dari Flipped Classroom ke Pembelajaran Berasaskan Flex Blended Learning <i>Intan Soliha Ibrahim</i>	237
<b>55</b>	PROAC <sup>2</sup> T: Proactive Reading to Accelerate Critical Thinking (in Literature Review) <i>Norliza Kushairi, Mohd Fairuz Jafar &amp; Nor Bibi Maslina Jusoh</i>	241
<b>56</b>	Implementing Learning Analytics Intervention in E-Learning to Support, Engage and Motivate Student in Learning <i>Kew Si Na, Zaidatun Tasir, Nurul Farhana Jumaat &amp; Noor Dayana Abd Halim</i>	246
<b>57</b>	Flexible Learning Opportunities Through Micro-Credentials <i>Dr. Tenku Putri Norishah Binti Tenku Shariman, Ms. Farihan Binti Abdullah @ Ja'afar, Nazirah Mat Sin &amp; Nik Idarwani Binti Nik Ahmad Damian</i>	250
<b>58</b>	Mudahnya BM: Personalised Mobile Learning Application Supported by Semantic-Based Technology <i>Sufri Muhammad, Novia Admodisastro, Mohd Hafeez Osman &amp; Norhayati Mohd Ali</i>	254
<b>59</b>	The Use of Animated Avatar for Interactive Asynchronous Learning Guided by the Star Technique to Improve Students' Learning Performance <i>Siti Shuhaida Shukor, Intan Safinas Mohd Ariff Albakri, Noor Alhusna Madzlan &amp; Aladdin Assaiqeli</i>	258
<b>60</b>	Get It Right: Determining Pricing Decisions Via Mobile App <i>Noor Fadzlina Mohd Fadhil, Anis Nursyafiqah Ab Wahab, Nurul Huda Mustafa, Rosmaria Jaffar, &amp; Shahida Shahrudin</i>	261
<b>61</b>	Lex Formulaic: Law Formula Mobile Apps <i>Zuhairah Ariff Abd Ghadas, Farhanin Abdullah Asuhaimi &amp; Muhammad Hannan Mohamad Shah</i>	267
<b>62</b>	Diabetes Escape Board Game <i>Sharifah Wajihah Wafa Syed Saadun Tarek Wafa, Mazlina Abu Bakar, Siti Maisarah Aziz, Karimah Fakhriah Ismail &amp; Ismahafezi Ismail</i>	270
<b>63</b>	Massive Open Online Course on Breastfeeding Self –Learning <i>Zaharah Sulaiman, Tengku Alina Tengku Ismail, Noraini Mohamad &amp; Nazirah Johar</i>	273



<b>64</b>	Student Teacher Enhancement Programme (Step): An Integrated Initiative Towards Improving Cross-Cultural Communication Skills <i>Velarde, Joseph M. &amp; Tan Shin Yen</i>	277
<b>65</b>	Simulating The Real World to the Classroom <i>Jen Ling Gan, Kim Leng Khoo &amp; Aqilah Yaacob</i>	283
<b>66</b>	D-QUIZZES: Strengthening Student's Understanding on Islamic Banking and Finance Taught Course using Web-Based Quiz <i>Nur Farahiah Azmi, Siti Rohana Mohamad, Siti Nurul Shuhada Deraman, Tahirah Abdullah &amp; Hazriah Hasan</i>	288
<b>67</b>	e-Clerking – Futuristic Learning in Medicine <i>Lim Yin Sear, Lim Su Yin, Prabal B., Punithavathy S., Benjamin Samraj Prakash Earnest, Anitha Ponnupillai &amp; Khine Pwint Phyu</i>	291
<b>68</b>	Virtual Experiential Learning: Lessons from Entrepreneurship Course in the New Norm <i>Noor Fzlinda Fabeil, Khairul Hanim Pazim, Juliana Langgat &amp; Roslinah Mahmud</i>	297
<b>69</b>	Minecraft Virtual World: A Tool for Concept Visualization in Engineering Mathematics <i>Soong Ming Foong &amp; Khoo Shin Yee</i>	302
<b>70</b>	REV-OPOLY ON THE GO <i>Noradila Nordin &amp; Goh Jun Jian</i>	306
<b>71</b>	MyEducator: Curriculum Design and Development on Mobile Application <i>Izwan Nizal Mohd Shahrane, Jastini Mohd Jamil, Muhamad Shahbani Abu Bakar &amp; Adyda Ibrahim</i>	310
<b>72</b>	A Toolkit for Investigating Suspected Contract Cheating <i>A.S.M. Harithuddin</i>	314
<b>73</b>	Blended Learning to Remote Learning: The Role of Self-Directed Assessment <i>Ashley Edward Roy Soosay</i>	318
<b>74</b>	Student Engagement Experiences in a Blended-Cooperative Learning Environment for Engineering Programming Class <i>Mohd Kamaruddin Abd Hamid</i>	323
<b>75</b>	Digital Comics as an Alternative Teaching and Assessment Tool for Biotechnology Courses <i>Nurashikin Suhaili, Awang Ahmad Sallehin Awang Husaini &amp; Dayang Salwani Awang Adeni</i>	328
<b>76</b>	Understanding Art Direction with Video Games through Playful Experiential Learning <i>Noranis Ismail</i>	334

<b>77</b>	Educating Generation Z: Effectiveness of Visually Aesthetic Study Notes in Virtual Learning Environment <i>Alicia Philip, Rosmiza Mokhtar &amp; Ili Farhana Ab Razak</i>	338
<b>78</b>	Teaching and Learning Financial Management Course Using e-Whiteboard <i>Tahirah Abdullah, Siti Afiqah Zainuddin, Nur Farahiah Azmi, Noorul Azwin Md Nasir, Siti Nurul Shuhada Deraman, Noorshella Che Nawi, Siti Rohana Mohamad, &amp; Wan Farha Wan Zulkifli</i>	344
<b>79</b>	Designing Virtual Event: An Outcome - Based Approach to Promote Student Learning Experience <i>Ng Wai Yee &amp; Sharon Linang Jimbun</i>	347
<b>80</b>	Taylor's Graduate Capabilities Student Project: Equipping First Year First Semester Students with Employability Capabilities <i>M.R Naveen Raman &amp; David Wong Kin Woon</i>	351
<b>81</b>	Pengembaraan Ali dan Dino (Siri COVID-19): The Development of Augmented Reality Application based on 5I Motivational Design Factors <i>Masyarah Zulhaida Masmuzidin &amp; NorAzah Abdul Aziz</i>	355
<b>82</b>	Closing the Gap through Multidisciplinary Experiential e-Learning among Law, Computing and Business Students in Fake News Detection in Times of Covid-19 <i>Sia Chin Chin, Tee Wee Jing, Aqilah Yaacob &amp; Raja Kumar Murugesan</i>	359
<b>83</b>	Exploring Future Preservice Teachers' Experience in Virtual Reality Role-Playing Micro-Teaching Activities using the EngageVR Platform <i>Dr. P. Thivilojana S. Perinpasingam, Dr. Charles Sharma Naidu &amp; Mr. Faisal Athar Bin Mohd Fadzil</i>	365
<b>84</b>	Public Service Announcement: Disability Awareness Among Malaysian Citizens <i>Aiman Syah bin Husin &amp; Jessifa Joanna Mohd Supian</i>	370
<b>85</b>	Students' Perspective on Online Video-Based Flipped Classroom to Teach Orthodontic Wire-Bending Skills <i>Saritha Sivarajan, May Nak Lau, Yasmin Kamarudin, Eunice Xinwei Soh, Nor Nadia Zakaria, Siti Adibah Othman, Wan Nurazreena Wan Hassan, Aufa Dahlia Bahar, Norhidayah @ Nor zahidah Mohd Tahir, Mang Chek Wey, Roziana Mohd Razi &amp; Zahra Naimie</i>	373
<b>86</b>	IMPAT: ALURKAN CERITAMU <i>Fadzilah Amzah, Norly Othman, &amp; Mohammad Faiz Samsuddin</i>	378
<b>87</b>	Jigsaw Classroom using Discord Platform for Interactive Synchronous Online Class <i>Nurul Ashikin Binti Daud, Nur Najahatul Huda Saris, NorAzliani Md Sapari, Nor Aishah Muhammad &amp; Noorhazirah Sunar</i>	386

<b>88</b>	e-FIQH Wanita Kontemporari <i>Tengku Fatimah Muliana Tengku Muda, Normadiyah Daud, Siti Fatimah Salleh, Siti Khatijah Ismail &amp; Syh. Noorul Madihah Syed Husin</i>	390
<b>89</b>	Designing and Managing Effective Online Assessments <i>Lee Pin Ling</i>	393
<b>90</b>	Enhancing English Speaking Skills Through Gamified Learning Activities <i>Mohd Firdaus bin Jusoh, Kazuki Iseho, Mohamad Muhaymein bin Ahmed Zawawi &amp; Mohd Suhaimi bin Abas</i>	400
<b>91</b>	Online Lab in a Box Hands on Activity: Do It Yourself Soap <i>Mohd Hafiz Abu Hassan, Muhammad Ilham Mamaud, Nurul Syazwani Kizzon &amp; Siti Aishah Mohammad Amin</i>	405
<b>92</b>	Connecting Mathematics to Real Life with Interactive Learning Modules <i>Irene Yang</i>	410
<b>93</b>	AMICA: An Adaptive Mobile Application for the Learning of Academic English with Pedagogical Agents <i>Chuah Kee Man &amp; Muhammad Kamarul Kabilan Abdullah</i>	415
<b>94</b>	“MasterBahasa” Mobile Application: A Gamified Approach <i>Low Kah Choon, Chai Li Yeang, Chong Say Lee &amp; Chai Khin Seong</i>	419
<b>95</b>	Enhancing The e-Teaching And e-Learning of Pharmaceutical Compounding via Microcredential Module <i>Amirah Mohd Gazzali</i>	427
<b>96</b>	Producing Theatre for a Live Online Audience: The POV (Point Of View) Technique to Simulate Audience Interactivity <i>Mark Beau de Silva</i>	432
<b>97</b>	VETPERT: A Veterinary Parasitology e-Revision Tool <i>Basripuzi Nurul Hayyan binti Hassan Basri, Intan Noor Aina binti Kamaruzaman, Nurshahirah binti Shahrulnizim, Ruhil Hayati binti Hamdan &amp; Tan Li Peng</i>	436
<b>98</b>	Mobile App for Environmental Analysis Laboratory Practical Learning <i>Sarva Mangala Praveena &amp; Manraj Singh Cheema</i>	440
<b>99</b>	Program Pembangunan Bahan Interaktif Teknologi <i>Augmented Reality</i> Melalui Buku Teks Sedia Ada Kementerian Pendidikan Malaysia <i>Hairul Nizam Hasnan, Nicola Sigat &amp; Norma Hazura Mohd Zulkafli</i>	444
<b>100</b>	Portal Pembelajaran Digital Bagi Meningkatkan Penglibatan dan Motivasi Murid dalam Proses Pengajaran dan Pembelajaran <i>Radziah Mokhtar, Aziah Amir, Chun Cheng Chuan, S’aleh Osman &amp; Normala Omar</i>	449
<b>101</b>	Pembangunan Perisian Kursus Interaktif Asas Sains Komputer Sistem Nombor Perduaan Menggunakan Animasi Jari <i>Tengku Norsuriani Tengku Putera &amp; Ahmad Nurzid Rosli</i>	459

<b>102</b>	Game-Based Learning as an Effective Tool for Enhancing Problem-Solving and Critical Thinking Skills <i>Ismat Zahra, Neo Mai &amp; Hew Soon Hin</i>	466
<b>103</b>	Transdisciplinary Degree Pathway Innovation <i>Tee Wee Jing, Sukhminder Kaur, Goh Wei Wei, Azween Abdullah &amp; David Asirvatham</i>	472
<b>104</b>	Share Annotative Lesson for Engaging Mathematics Learning <i>Ng Eng Hui</i>	476
<b>105</b>	Mind-Mapping Tool to Enhance Application of Economic Knowledge for Hybrid Learning <i>Malarvilly Ramayah &amp; Haniffa Beevi Abdul Jaleel</i>	480
<b>106</b>	Assessing Critical Thinking using Laboratory Data-Generators: A Case Study on Cloning of CRISPR Construct <i>Wei Hsum Yap, Gareth Denyer, &amp; Bey-Hing Goh</i>	485
<b>107</b>	Community's Hybrid Program on Used Cooking Oil Recycling Management among Single Mothers <i>Noorzana Khamis, Norulhuda Ismail, Noor Azean Atan &amp; Mohd Fauzi Abu@Hussin</i>	490
<b>108</b>	Speak-O-Mind: Expanding Your Thoughts through Guided Writing <i>Syakirah Shafien, Lena Ramamurthy, Noor Syamimie Mohd Nawawi, Shahidatul Maslina Mat So'od &amp; Nik Ahmad Farhan Nik Azim</i>	495
<b>109</b>	Gamified Hybrid Service-Learning for Students Engagement in Computer Network Course (GAMYSEL) <i>Azizah Yusof, Noor Azean Atan, Jamalludin Harun, Salmalina Salleh &amp; Noorzana Khamis</i>	502
<b>110</b>	Embedding Micro-Credential Concept in Financial Management Modular Course <i>Norazidah Shamsudin, Awanis Romli, Airin AbdulGhani &amp; Fadzida Ismail</i>	507
<b>111</b>	The Gene Detective: A Novel Steam e-Learning Approach to Learning DNA, Genes & PCR <i>Kok Yee Zhen, Lee Kean Wah, Gan Kok Beng &amp; Then Sue-Mian</i>	511
<b>112</b>	An Improved Flipped Classroom Approach for The Flexible e-Learning <i>Khaw Khai Wah &amp; Chew XinYing</i>	515
<b>113</b>	e-Learning on Microorganism Around Us <i>Leong Sui Sien, Noorasmah Saupi, Murin Anak Balang &amp; Denny Brooke Anak Jilan</i>	520
<b>114</b>	SPEAR: A Guide to Use Video-Annotated Peer Feedback in Developing Oral Presentation <i>Catherine Nguoi Chui Lam &amp; Hadina Habil</i>	525
<b>115</b>	In-Class Teams Virtual Implementation <i>Jehana Ermy Jamaluddin</i>	529

<b>116</b>	Rule-Based Matching System on Cloud Service for Identifying Best Suitable Engagement in Community Service Learning <i>Masnida Hj. Hussin, Siti Iman Nabihah Azman &amp; Sazlinah Hasan</i>	533
<b>117</b>	I-Sejarah: Interactive Learning Mobile Application for History Subject <i>Nur Aqilah binti Mohammad Kamal &amp; Hizmawati Madzin</i>	538
<b>118</b>	Development of Interactive 3D Virtual Reality in Radiography Education <i>Elza Azri Othman, Ariff Hasbullah Hamdani, Nikk Noor Afifah Roslan, Juliana Mohd Radzi, Kamarul Amin Abdullah, Fairuz Mohd Nasir &amp; Nur Hayati Jasmin</i>	542
<b>119</b>	Digital Interactive e-Module for Geographic Information Systems (GIS) Application in Ecosystem Services Modeler <i>Amal Najihah Muhamad Nor, Muhamad Azahar Abas, Nurul Syazana Abdul Halim, Nor Hizami Hassin, Nor Shahirul Umirah Idris, Siti Aisyah Nawawi, Kamarul Ariffin Kambali, Hasifah Abdul Aziz, Rohazaini Muhammad Jamil, Norfadhilah Ibrahim, Nur Hanisah Abdul Malek &amp; Nur Hairunnisa Rafaai</i>	546
<b>120</b>	Student's Attention Deficit Monitoring and Profiling System using Electroencephalography and Machine Learning Approach <i>Eng Lye Lim, Wei Wei Goh &amp; Kung Pui Law</i>	550
<b>121</b>	Transforming Educational Video into Interactive, Immersive, Personalised, and Gamified Experiences <i>Wong Yau Hsiung</i>	555
<b>122</b>	Personalizing Virtual Learning for Law Students through Interactive Video Branching in a Post Pandemic World <i>Puteri Sofia Amirnuddin</i>	559
<b>123</b>	Medical Imaging Education Platform <i>Anas Tharek, Ahmad Sobri Muda, Mohd Naim Yaakob, Mohd Fandi Alhafiz Kamis, Soo Tze Hui, Izzat Sabri, Farzanah Yamba &amp; Erfeezal Roslan</i>	564
<b>124</b>	AR-CSI Module and AR-CSI Mobile Application for Molecular Geometry and Polarity Concepts <i>Tien Tien Lee, Jamilah Hamid, Nor Syatilla Haerany Abd Ghani, Mohamad Syahrizal Ahmad &amp; Yuhanis Mhd Bakri</i>	569
<b>125</b>	Measuring Learning Outcomes using Web Based System Loams <i>Kamaruzzaman Ismail &amp; Shahrizad Mohd Sharifuddin</i>	574
<b>126</b>	Interactive Simulation-based Process Control Laboratory to Enrich Online Distance Learning during Covid-19 Pandemic <i>Serene Sow Mun Lock, Irene Sow Mei Lock, Norwahyu Jusoh &amp; Lam Ghai Lim</i>	584
<b>127</b>	(IVRAS4CROSE) – Bijak Melintas: Immersive VR with Tamed Cybersickness <i>Nur Sauri Yahaya, Ariffin Abdul Mutalib, Sobihatun Nur Abdul Salam &amp; Hanis Salwani Othman</i>	589

<b>128</b>	Bridging the Urban-Rural Divide on Knowledge Dissemination and Learning Process (BURDLe) <i>Noris Mohd. Norowi, Ain Arissa Zainuddin, Rahmita Wirza O.K. Rahmat, Mas Nida Khambari, Azrina Kamaruddin, Roziah Mohd. Rasdi, &amp; Ahmad Suhaizi Mat Su</i>	593
<b>129</b>	SimOPD: Simulated Outpatient Pharmacy Department Clerkship <i>Siti Maisharah Sheikh Ghadzi, Sohail Aziz, &amp; Amer Hayat Khan</i>	599
<b>130</b>	SimPCare@USM©: An Innovative Online Simulated Clinical Pharmacy Clerkship Platform <i>Sabariah Noor Harun, Orwa Albitar, &amp; Abubakar Usman</i>	604
<b>131</b>	I-Persona: Interpersonal Skills for Medical Personnel <i>Nurulhuda Mat Hassan, Norwati Daud, Nik Nor Ronaidi Nik Mahdi, Yuzana Mohd Yusop &amp; Mohd Salami Ibrahim</i>	609
<b>132</b>	Interprofessional Education between Pharmacy and Medical Student: A Virtual Approach <i>Ganesh Sritheran Paneerselvam</i>	613
<b>133</b>	TAPS Software Using Flipped Classroom Approach <i>Low Min Chi, Lee Chen Kang, Manjit Singh Sidhu, Lim Seng Poh, &amp; Lim Seng Chee</i>	618
<b>134</b>	Augmented Reality of Mesenteric Blood Supply (AR MEBS): A Metaverse Pathway in Anatomy and Physiology Subjects <i>Nur Izzah Ab Razak, Nurul Izzati Mohd Fauzi &amp; Rahmita Wirza O.K. Rahmat</i>	623
<b>135</b>	Heart Tour to Discover Cardiovascular Physiology – A Student-Centred e-Learning Approach <i>Zubaidah Hasain, Siti Hajar Adam, Amirul Rosli, Jeevan Kathiresan &amp; Muhammad Danielizwan Majid</i>	627
<b>136</b>	Cross Border MOOC for Project Based Learning <i>Chockalingam Aravind Vaithilingam, Pang Ming Meng &amp; Tee Lee Hong</i>	631
<b>137</b>	The Effects of Working Memory and Relaxation Training (WMRT) Intervention on Working Memory Performance of Secondary School Students with Anxiety <i>Nornabilah Ali, Aini Marina Ma'rof, Ahmad Fauzi Mohd Ayub &amp; Zaida Nor Zainudin</i>	636
<b>138</b>	The Effects of Micro-Lecture Approach on Students' Engagement in Flipped Classroom Environment <i>Voon Yeun Ting</i>	641
<b>139</b>	Creating a Virtual Learning Environment (VLE) Using the Engage VR Platform to Create an Immersive Virtual Presence <i>Ts. Dr. Goh Wei Wei, Goh Pui Leng, &amp; Dr. Charles Sharma Naidu</i>	646
<b>140</b>	Teach-Do It-Reflect- Improve (TDiRI) with Active, Fun, and Technology Elements <i>Hafizah Mohamad Hsbollah</i>	652

<b>141</b>	Drama in Education for Chinese Language Class and Its Effectiveness on Non-Native Speakers in Malaysia <i>Nik Norafiqah Nik Ibrahim, Zhang Xiao Hui, &amp; Nik Nor Liyana Nik Ibrahim</i>	656
<b>142</b>	“Hands-On Extraordinary Resin Art” Secara Atas Talian <i>Wan Heng Fong, Athirah Balqis Mohd Sharif &amp; Norarfinah Ariffin</i>	660
<b>143</b>	Classtools: Fun Learning in Philosophy and Current Issues <i>Siti Fathihah Abd Latif, Shahidatul Maslina Mat Sood, Lena Ramamurthy, Syakirah Shafien &amp; Noor Syamimie Mohd Naw</i>	664
<b>144</b>	A Gamified Approach to Enhance Student’s Conceptual Understanding of Light: LENSOS-M <i>Siti Maisarah Aziz, Azma Abdul Malek, Nurulhuda Mohammad Yusoff, Salmiah Jamal Mat Rosid, &amp; Siti Noor Syuhada Muhammad Amin</i>	669
<b>145</b>	Pop-Up Board: Creative Ideas for Interactive and Fun Presentation <i>Nor Akmar Abdul Aziz, Thiyva Laxshmy Raman, Nur Jazilah Jaafar, Nordiana Mohd Nordin, &amp; Fiffy Hanisdah Saikim</i>	674
<b>146</b>	Automated e-Rubric Calculator for Final Year Project Assessment <i>Noorul Azwin Md Nasir, Noorshella Che Naw, Siti Afiqah Zainuddin, Wan Farha Wan Zulkifli &amp; Tahirah Abdullah</i>	679
<b>147</b>	Virtual Anatomy Museum Visit to Facilitate Student Engagement and Self-Paced Learning Through an Interactive Platform <i>Yow Hui Yin</i>	683
<b>148</b>	Enhance Working Memory Performance using Music-based Working Memory Training via Mobile Application <i>Hue Chi Yin, Aini Marina Ma'rof, Samsilah Roslan, Chan Cheong Jan &amp; Yusni Mohamad Yusop</i>	688
<b>149</b>	FinEd: Financial Literacy Through Edutainment <i>Sakinah Ali Pitchay, Muhamad Badrul Amin Mohd Tarmizi, Muhammad Syahmi Imran Mohamad, Aufa Abdullah &amp; Auni Halili Zamburi</i>	693
<b>150</b>	What Contributes to the Promotion of Higher Order Thinking Skills in Mathematics Techonology Enhanced Learning Environment? <i>Malathi Letchumanan, Sharifah Kartini Said Husain, Ahmad Fauzi Mohd Ayub, &amp; Chau Kien Tsong</i>	699
<b>151</b>	Mobile Augmented Reality-Based Learning: The Way Forward in Technical Vocational Education and Training <i>Nalienaa Muthu, Faieza Abdul Aziz, Lili Nurliyana Abdullah, Makhfudzah Mokhtar, Muhd Khaizer Omar, Lai Lai Win &amp; Nadia Abdul Rani</i>	702
<b>152</b>	Embedding Rational Emotive Behaviour Therapy Tool in the University’s Core Module Learning and Assessment for First Year Students <i>Delicia Ng Ly Ann &amp; David Wong Kin Woon</i>	707

<b>153</b>	Effect of Interactive Extended Reality Platforms for Assembly Tasks in Tertiary Education <i>Lai Lai Win, Faieza Abdul Aziz, Abdul Aziz Hairuddin, Lili Nurliyana Abdullah, Hwa Jen Yap, Hideo Saito, Norhisham Seyajah, Nalienia Muthu &amp; Nadia Abdul Rani</i>	712
<b>154</b>	Think Before You Answer: Fostering Deep Thinking among Students Through Moodle's Certainty-based Marking (CBM) <i>Nurul Zawiyah Mohamad, Izzatul Nabila Sarbini, Jennifer Fiona Wilfred Busu &amp; Norazian Mohamad Hamdan</i>	718
<b>155</b>	Comparison of Cognitive, Affective and Psychomotor Performances Among Biomedical Science Students in the Acquisition of Aseptic Techniques Using Virtual Reality Application and Traditional Teaching Method <i>Chau Ling Tham, Manraj Singh Cheema, Puteri Suhaiza Sulaiman, Hanis Hazeera Harith, Hasni Idayu Saidi, Cheng Wei Lim, Sie Hui Lim &amp; Kong Yen Liew</i>	723
<b>156</b>	Youths Involvement in Agriculture Through the Lens Of 'Youngiculture' Campaign <i>G Manickam Govindaraju</i>	728
<b>157</b>	Microbiology Virtual Day 2021: An Authentic Online Assessment of Process and Product <i>Sharina Hamzah</i>	733
<b>158</b>	Crossing Cultures in Psychology's Global Classroom <i>Lim Hooi Shan</i>	737
<b>159</b>	Clinical Dietetic Training Electronic Remote Monitoring (DIET-eRM) <i>Chin Yi Ying, Sakinah Harith &amp; Mohd Ibrahim Abdullah</i>	740
<b>160</b>	I-Peer Review via eLearn@USM <i>Mohd Salman Abu Mansor</i>	746
<b>161</b>	Revolution Of Traditional Teaching Approach Towards Remote Learning Environment for Chemical Engineering Fluid Mechanics Course Amidst Covid-19 Outbreak – Practical Guideline <i>Norwahyu Jusoh &amp; Serene Lock Sow Mun</i>	749
<b>162</b>	CIA-PEA Framework for Remote Learning Management System in Higher Education <i>Lena Ramamurthy, Syakirah Shafien, Noor Syamimie Mohd Nawawi, Shahidatul Maslina Mat So'od &amp; Siti Fathihah Abd Latif</i>	753
<b>163</b>	Making & Breaking: Curation of an Experimental Exercise Toolbox for Teaching Building Structures Online <i>Jan-Frederik Flor, Najah MD Alwi &amp; Juliza Mohamad</i>	758



## **Preface**

*by the Editors*

Centre for Academic Development (CADE) Universiti Putra Malaysia had the privilege and honour of organising the International University Carnival on E-Learning 2022 (IUCEL2022) in collaboration with the Ministry of Higher Education Malaysia (MoHE). The event was supported by the Department of Higher Education, MoHE and the Public University e-Learning Council (MEIPTA). IUCEL2022 which was organized virtually on Gather, a metaverse platform from 28<sup>th</sup> to 30<sup>th</sup> June 2022, has marked UPM's capabilities to unearth the talents of 294 e-learning innovators representing 38 institutions from 10 countries (Malaysia, Germany, China, South Korea, Jordan, Iraq, Singapore, Philipines, Indonesia and Myanmar). IUCEL2022 was successful in providing a platform for educators to facilitate the dissemination and sharing of their innovation on e-learning which are aptly reflected through the papers presented in this e-proceedings.

We invited all presenters of IUCEL2022 to submit their extended abstract in June 2022. The selection of 163 articles from diverse disciplines was then concluded in September 2022. All papers were subjected to substantial peer review to ensure their originality, significance and impact on higher education..As a result, we are confident that this e-proceedings will be of interest to a diverse readership.

The theme of IUCEL 2022 inspired the title of this e-proceedings, "Innovating Education for a Better Tomorrow". We would like to take this opportunity to thank Professor Dr. Ismi Arif Ismail, the Advisor of IUCEL2022 as well as Associate Professor Dr. Wan Marzuki Wan Jaafar, the Chairman of IUCEL2022, for their vision and exceptional leadership in making the event a reality. We would also want to express our profound gratitude to all authors (as well the reviewers) who put in immense effort to contribute to these e-proceedings.

Finally, we would like to put on record our gratitude to all staff members at CADE, who made IUCEL2022 a resounding success.

# AMICA: An Adaptive Mobile Application for the Learning of Academic English with Pedagogical Agents

Chuah Kee Man<sup>1,2\*</sup> & Muhammad Kamarul Kabilan Abdullah<sup>2</sup>

<sup>1</sup>Faculty of Language and Communication, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia.

<sup>2</sup>School of Educational Studies, Universiti Sains Malaysia, Penang, Malaysia

\*Corresponding author's email: kmchuah@unimas.my

---

## Abstract

*The mastery of academic English at tertiary levels is undeniably pivotal in ensuring students' progress and success. Its importance is due to the number of academic materials that students need to refer to and they are largely published in English. In teaching academic English, however, lecturers tend to face problems in providing sustainable guidance and meaningful feedback to the students. Hence, this project proposes a viable solution by introducing a mobile application that could be used to as a tool for students to independently learn academic English. The Adaptive Mobile Interactive Coach for Academic English (or known as AMICA) is a mobile application equipped with interactive pedagogical agents that would constantly guide students in academic reading and writing. In the reading module, they would be able to learn the proper strategies to read journal papers and academic materials through the adaptive and interactive assistance provided by the virtual agent or coach. As for the writing module, they would be able to obtain feedback from the AMICA app on the more accurate way of expressing ideas academically, especially in terms of using academic words and sentence structure. The AMICA app has been piloted on 35 undergraduate students and the outcomes from the test are encouraging. A majority of the students considered it as effective since they treat it like a virtual friend that guides them without the need to disturb their lecturers constantly. It also motivates them to master academic English as the AMICA app was designed to be engaging and interesting rather than the typical lecture-style delivery of the subject. Further improvements will be made to the AMICA app before it is publicly released.*

**Keywords:** mobile application, academic English, pedagogical agents, mobile learning

## Background of the Innovation

In the English as a Second Language or Foreign Language (ESL/EFL) contexts, the teaching of academic English is often perceived as very challenging due to its greater demand of complex language constructions than other domains of language use (Selvaraj & Abdul Aziz, 2019). ESL and EFL students constantly struggle to cope with academic English requirements especially in the higher education settings where most academic materials and references are published in English. Despite the use of various blended learning tools among undergraduates (Adams et al., 2021) and other more advanced devices such as humanoids (Guggemos et al., 2020), many of them still could not enhance their academic English competence. Previous studies have investigated various factors that hinder students' progress in mastering academic English and one problem that is prevalent is the lack of formative feedback (Huisman et al., 2019; Knight et

al., 2020). Instructors were not able to constantly provide quality feedback to the learners particularly in terms of reading and writing skills since students are expected to learn independently using existing tools to perform self-monitoring and self-study. Examples of these tools are Grammarly, Turnitin, Quillbot, and RefnWrite. The primary problem with these tools is that they lack pedagogical scaffolding and adaptiveness in guiding students consistently. Students have to rely on their own ability to comprehend the analytical information or tips given (Knight et al., 2020). Such a situation poses more confusion and the feedback given may not be meaningful to them. Furthermore, learning is a complex process that encompasses both cognitive processing skills and social interactions between students and instructors. Hence, this innovation aims to address this problem by introducing an adaptive mobile application that is equipped with pedagogical agents.

### **Description of the Innovation**

The innovation is named as the Adaptive Mobile Interactive Coach for Academic English (AMICA), and it is designed for the teaching and learning of academic reading and writing. Based on the synthesis of research on virtual pedagogical agents done in the last decade, several key features are incorporated into AMICA, which include:

- i. **Interactive 2D pedagogical agents** – To enhance user-friendliness and reduce cognitive load, 2D pedagogical agents for each module are used. As suggested by Alfaro et al. (2020), 2D agents reduce the redundancy effect of cognitive load theory significantly. In the AMICA app, students are given a choice to pick the agents that they like and adjust the level of interactivity accordingly (e.g., frequency of guidance, activation of voice feedback)
- ii. **Adaptive levels** – Students will be able to learn both academic reading and writing modules progressively according to their levels. As they use the app, pertinent data will be collected in order to adjust the types of information or scaffolding provided by the pedagogical agents. Also, the app contains more practices for students that may not cross the threshold set for each level, giving them more motivation to improve. Besides, students can track their progress in each level that has badges for them to collect. Level-adaptation has been studied to increase students' willingness to stay on track in their learning (Nushi & Fadaei. 2020).
- iii. **Social presence** – The AMICA app is designed with the goal of elevating social presence in the learning process in a way that the students would feel like they are interacting with a dependable coach. Our earlier research on this project (Chuah & Kabilan, 2021) found that interactive chatbots were able to engage students more effectively and they were noted to be more proactive in learning. In this app, the social presence is increased through the conversational cues presented via the pedagogical agents.

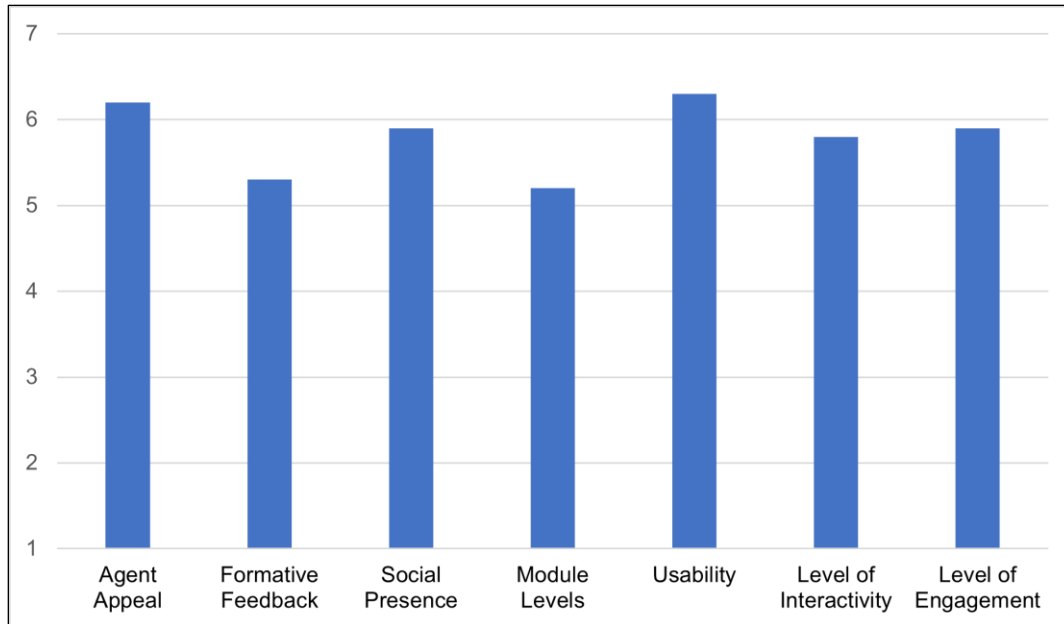
### **Significance of the Innovation**

The AMICA app can assist instructors who are teaching academic English by providing constant feedback to the students. As a mobile app, students can also use it as an on-demand self-learning tool without the hassle of using a different device or expensive software. Thus, it widens the opportunity for students to practise academic English regularly with formative feedback. Indirectly, it also reduces the burden of instructors in monitoring students' progress.

### **Impact of the Innovation Towards Education**

The AMICA app has been piloted in an academic reading and writing class with 35 undergraduate

students. They were asked to use the app for five weeks and provide their rating (a scale of 1 to 7, with 1 being the lowest and 7 being the highest) in a given questionnaire with items aligned to seven constructs or aspects as shown in Figure 1. The students rated the AMICA app highly as the average rating for each aspect is greater than 5.0. Most notably, the subsequent follow-up discussion with some of the students revealed that they find the app particularly useful in motivating them to learn the topics covered. They also thought that the use of pedagogical agent was refreshing to them as it serves like a virtual friend that never get bored in helping them. Nonetheless, they have identified some areas for improvement especially the quality of formative feedback, which in some levels, was rather repetitive. On the whole, the pilot test has shown that the app can be impactful in the context of learning academic English.



**Figure 1:** Overall Rating of the AMICA App According to Key Constructs

### Commercialization Potential

The AMICA app has the potential to be commercially published in relevant mobile app market stores such as Apple App Store, Android Play Store and Huawei AppGallery. The “freemium” model is noted to be suitable for the app, as students would be able to use the app for free with unlockable features that requires payments or subscriptions. The content of the app could also be modified to cover other domains of English language use such as English for occupational purposes or business English. This flexibility increases the potential for greater use of the app.

### Conclusion

All in the all, the AMICA app shows promising contribution in enhancing students’ competency in mastering academic English through the use of mobile-based pedagogical agents. The initial testing of the app has yielded positive reviews from the target users, and they find it very useful and also effective in providing constant feedback. The current version of the app would be improved before it is publicly released in the major app markets.

## Acknowledgement

The authors would like to express their appreciation for the support of Universiti Malaysia Sarawak and Ministry of Higher Education in the design and development of this innovation.

## References

- Adams, D., Chuah, K. M., Mohamed, A., Sumintono, B., Moosa, V., & Shareefa, M. (2021). Bricks to Clicks: Students' Engagement in e-Learning during the COVID-19 Pandemic. *Asia Pacific Journal of Educators and Education*, 36(2), 99–117. <https://doi.org/10.21315/apjee2021.36.2.6>
- Alfaro, L., Rivera, C., Luna-Urquizo, J., Castañeda, E., Zuñiga-Cueva, J., & Rivera-Chavez, M. (2020, December). New Trends in Pedagogical Agents in Education. In *2020 International Conference on Computational Science and Computational Intelligence (CSCI)* (pp. 923-928). IEEE. <https://doi.org/10.1109/CSCI51800.2020.00172>
- Castro-Alonso, J. C., Wong, R. M., Adesope, O. O., & Paas, F. (2021). Effectiveness of Multimedia Pedagogical Agents Predicted by Diverse Theories: A Meta-Analysis. *Educational Psychology Review*, 33(3), 989-1015.
- Chuah, K. M., & Kabilan, M. (2021). Teachers' Views on the Use of Chatbots to Support English Language Teaching in a Mobile Environment. *International Journal of Emerging Technologies in Learning (IJET)*, 16(20), 223-237. <https://doi.org/10.3991/ijet.v16i20.24917>
- Guggemos, J., Seufert, S., & Sonderegger, S. (2020). Humanoid Robots in Higher Education: Evaluating the Acceptance of Pepper in the Context of an Academic Writing Course using the UTAUT. *British Journal of Educational Technology*, 51(5), 1864-1883.
- Huisman, B., Saab, N., van den Broek, P., & van Driel, J. (2019). The Impact of Formative Peer Feedback on Higher Education Students' Academic Writing: A Meta-Analysis. *Assessment & Evaluation in Higher Education*, 44(6), 863-880.
- Knight, S., Shibani, A., Abel, S., Gibson, A., & Ryan, P. (2020). AcaWriter: A Learning Analytics Tool for Formative Feedback on Academic Writing. *Journal of Writing Research*, 12(1), 141-186.
- Nushi, M., & Fadaei, M. H. (2020). Newsela: A Level-Adaptive App to Improve Reading Ability. *Reading in a Foreign Language*, 32(2), 239-247.
- Selvaraj, M., & Aziz, A. A. (2019). Systematic Review: Approaches in Teaching Writing Skill in ESL Classrooms. *International Journal of Academic Research in Progressive Education and Development*, 8(4), 450-473.