

Research Statement

Michelle CHEONG Lee Fong
School of Information Systems, Singapore Management University
Tel: (65) 6828-0269; Email: michcheong@smu.edu.sg
November 2023

Background

My research has evolved over the years across four main areas: ***Learning Analytics and AI in Education, Spreadsheets Modeling & Pedagogy, Data Analytics & Decision Analytics***, and ***Operations Management***. These four areas have overlapping time periods and the progression from one to the next has been natural, as the topics involved are overlapping as well. I am the lead author or lead co-author of all my publications, according to the authorship rules established at SMU.

Research Areas

a) Learning Analytics and AI in Education (2018 ~ today)

This research involves the development of systems to enhance student learning using machine learning algorithms to automate learning tasks, as well as collecting the user data to analyse the effectiveness of using such systems to achieve the desired learning outcomes. One such system is the integrated Telegram and web-based Q&A platform where students can post questions and answer questions, openly and freely, with the goals of achieving collaborative learning and mutual support, throughout the course. The new related areas which I have started to explore with my Doctor of Engineering (EngD) students from 2021 include assessments in digital education, the ethical issues in AI-driven assessments, and technology-enabled informal learning and workplace learning. With the launch of Generative AI tools, my recent research work has moved towards assessing the impact of GAI and applications of GAI in teaching and learning. I am also involved in two research grant proposal submissions as PI and Co-PI where the projects involve using GAI for teaching and learning of technical subjects.

b) Spreadsheets Modeling and Pedagogy (2008 ~ today)

This research is influenced by the courses I teach at SMU, my role as the Associate Dean of Postgraduate Professional Education, and the pedagogical concerns related to teaching and learning. The ability to model open, unstructured business problems into spreadsheet models for detail analysis has become increasingly important in the fast-changing business environment. My research focused on developing good teaching cases to teach effective modelling skills, and designing, developing and delivering a professional programme to address the knowledge

and skills gap in the industry, so as to train the next generation of leaders for the industry.

c) Data Analytics and Decision Analytics (2012 ~ today)

Practitioners would know that real business problems do not present themselves clearly, often resulting in people solving the wrong problem. Thus, my proposed Data and Decision Analytics Framework aims to help the analyst to first identify the actual cause of business problems by collecting, preparing, and exploring data to gain business insights, before proposing what objectives and solutions can and should be done to solve the problems. Such a framework combines identification of the root causes by data analytics, and proposing solutions supported by decision analytics. This research area involves close collaboration with industry partners, with interesting and important problems, to solve and create positive economic impact for companies. For research work related to pure Data Analytics, the focus is in text mining and Natural Language Processing to analyse textual data from tweets to perform sentiment analysis and prediction.

d) Operations Management (2004 ~ 2014)

This research focused on how supply and demand within a logistic network can be coordinated through different mechanisms such price discount, combinatorial auction, allocation algorithm, better network design and better flow. These questions are important to solve as real problems faced in logistics and supply chains require solutions which are quick to solve, superior in terms of effectiveness and efficiency, and most importantly are practical for implementation. My background in Operations Management has evolved into data and decision analytics research in later years.

Selected Publications and Outputs

a) Learning Analytics and AI in Education (2018 ~ today)

1. "ChatGPT's Performance in Spreadsheets Modeling Assessments based on Revised Bloom's Taxonomy", by Michelle CHEONG (2023). *Proceedings of the 30th International Conference on Computers in Education, ICCE 2023*, 4 to 8 Dec 2023, Matsue, Shimane, Japan. (Forthcoming) – **CORE B in 2021**
2. "Analytics-enabled Authentic Assessment Design Approach for Digital Education", by LIM, Tristan; GOTTIPATI, Swapna; CHEONG, Michelle; NG, Jun Wei; PANG, Christopher. (2023). *Education and Information Technologies*, 1-24. <https://doi.org/10.1007/s10639-022-11525-3> – **Cite Score = 8.2, 95th percentile under Education sub-category = Q1 in SCOPUS**
3. "Authentic Assessments for Digital Education in the Higher Education Landscape: Emerging Technologies Shaping Assessment Practices", by

Tristan LIM, Swapna GOTTIPATI and Michelle CHEONG (2022). *Proceedings of the 30th International Conference on Computers in Education, ICCE 2022*, 28 Nov to 3 Dec 2022, Kuala Lumpur. <https://icce2022.apsce.net/proceedings/volume1/> pp 587 – 592.

4. “Assessment Design for Digital Education: An Analytics-based Authentic Assessment Approach”, by Tristan LIM, Swapna GOTTIPATI, Michelle CHEONG, Chris PANG and Jun Wei NG (2022). *Proceedings of IEEE International Conference on Teaching, Assessment and Learning for Engineering TALE 2022*, December 4 to 7, Hongkong.
 5. Book Chapter: “Learning Analytics in Informal, Participatory Collaborative Learning”, Michelle L. F. CHEONG; Jean Y.-C. CHEN; B.T. DAI. (2021). In Tarek Rana, Alan Lowe, Jan Svanberg (Ed.), *Big Data and Analytics in Accounting and Auditing*, Springer-Nature. (Accepted)
 6. “A Qualitative Evaluation of SMU’s Peer Helpers Programme”, by KOH, Angela; CHEONG, Michelle L.F. (2021). *International Journal of Evidence Based Coaching and Mentoring*, 19 (1), 152-170. https://radar.brookes.ac.uk/radar/file/b26d7eab-d6a6-4a52-aba3-28c2d7922a89/1/19_1_11.pdf
 7. “Analysis of Online Posts to Discover Student Learning Challenges and Inform Targeted Curriculum Improvement Actions”, by Michelle L.F. CHEONG, Jean Y.-C. CHEN, B.T. DAI. (2020). *Proceedings of IEEE International Conference on Teaching, Assessment and Learning for Engineering TALE 2020*, 8 to 11 December, Japan (Virtual).
 8. “An Intelligent Platform with Automatic Assessment and Engagement Features for Active Online Discussions”, by Michelle LF CHEONG, Jean Yun-Chen CHEN, and Bing Tian DAI, (2019). *32nd International Conference on Industrial Engineering & Other Applications of Applied Intelligent Systems (IEA/AIE) 2019*, 9 to 11 July, Graz, Austria. Published in “Advances in Artificial Intelligence – From Theory to Practice, LNAI 11606, pp 730-743.
 9. “Integrated Telegram and Web-based Forum with Automatic Assessment of Questions and Answers for Collaborative Learning”, by Michelle LF CHEONG, Jean Yun-Chen CHEN, and Bing Tian DAI, (2018). *Proceedings of IEEE International Conference on Teaching, Assessment and Learning for Engineering TALE 2018*, 4 to 7 December, Wollongong, Australia.
- b) Spreadsheets Modeling & Pedagogy (2008 ~ today)
1. “Innovative and Effective Spreadsheet Tool for Learning Sentiment Analysis and Prediction”, by Michelle L. F. CHEONG and Jean Y.-C. CHEN (2022).

Proceedings of the 30th International Conference on Computers in Education, ICCE 2022, 28 Nov to 3 Dec 2022, Kuala Lumpur.
<https://icce2022.apsce.net/proceedings/volume1/> pp 262 – 267.

2. "Internship and Curriculum Development for Post-graduate Analytics Students – A case study on Master of IT in Business Programme in Singapore Management University", by Yanru GUO and Michelle LF CHEONG (2022). *Proceedings of IEEE International Conference on Teaching, Assessment and Learning for Engineering TALE 2022*, December 4 to 7, Hongkong.
3. "An Essential Applied Statistical Analysis Course using RStudio with Project-Based Learning for Data Science", by Aldy GUNAWAN, Michelle LF CHEONG, and Johnson POH, (2018). *Proceedings of IEEE International Conference on Teaching, Assessment and Learning for Engineering TALE 2018*, December 4 to 7, Wollongong, Australia.
4. "The Making of a Successful Analytics Master Degree Program: Experiences and Lessons Drawn for a Young and Small Asian University", by Michelle LF CHEONG, (2017). *International Journal of Business Intelligence Research*, 8(1).
5. "The Making of a Successful Analytics Master Degree Program: Experiences and Lessons Drawn for a Young and Small Asian University", by Michelle LF CHEONG, (2017). *5th International Big Data and Analytics Educational Conference*, 14 to 16 July 2017, Langkawi, Malaysia.
6. Book Chapter: "The Wonders of the Spreadsheet Tools for Data Management and Insights", by Michelle LF CHEONG, *Mobilising Diverse Community Assets to Meet Social Needs*, an IPS Exchange Series, No. 12 (Oct 2017), a publication by the Institute of Policy Studies.
7. "Scenario-Based Simulation Game for Hospital Beds Capacity Planning in Singapore", by Michelle LF CHEONG and Li Siong LIM, (2016). *7th International Conference on Education, Training and Informatics (ICETI 2016)*, 8-11 March 2016, Orlando, USA.
8. "Business Modelling with Spreadsheets: Problems, Principles, and Practice", by Thin Yin LEONG and Michelle LF CHEONG, 3rd Edition, (2015). *McGraw-Hill*, Singapore.
9. "Get Trained, Be Future-Ready", by Michelle LF CHEONG, *SCS Magazine*, (2014).
10. "Business Modelling with Spreadsheets: Problems, Principles, and Practice", by Thin Yin LEONG and Michelle LF CHEONG, 2nd Edition, (2011). *McGraw-Hill*, Singapore.

11. "Essential Spreadsheet Modeling Course for Business Students", by Thin Yin LEONG and Michelle LF CHEONG, (2009). *OR/MS Today*, 08/2009, United States of America.
12. "Spreadsheet Modeling of Hotel Room Sales and Demand Distribution Estimation", by Thin Yin LEONG and Michelle LF CHEONG, (2009). Vol. 7, 1, *Decision Sciences Journal of Innovative Education*, Decision Sciences Institute, 89-97, United States of America.
13. "Business Modelling with Spreadsheets: Problems, Principles, and Practice", by Thin Yin LEONG and Michelle LF CHEONG, 1st Edition, (2008). *McGraw-Hill*, Singapore.
14. "Spreadsheet Modeling of Equipment Acquisition Plan", by Thin Yin LEONG and Michelle LF CHEONG, (2008). Vol. 6, 2, *Decision Sciences Journal of Innovative Education*, Decision Sciences Institute, 365-373, United States of America.
15. "Teaching Business Modeling using Spreadsheets", by Thin Yin LEONG and Michelle LF CHEONG, (2008). Vol. 9, 1, *INFORMS Transactions on Education*, 20-34, United States of America.

c) Data Analytics & Decision Analytics (2012 ~ today)

1. "Singapore Airlines: Profit recovery and aircraft allocation models during the COVID-19 pandemic", CHEONG, Michelle L. F.; CHONG, Ulysses; CHONG, Anne; NGUYEN, Nhi Thai An; ANG, Su Yiin; DJOJOSAPUTRO, Gabriella; ADIPRASETYO, Gordy; GADONG, Kendra. (2021). *Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management Singapore*, March 7-11, 2021, Virtual Conference
2. "Capitalising Product Associations in a Supermarket Retail Environment", by CHEONG, Michelle L. F.; CHIA, Yong Qing. (2020). *Decision Sciences Institute 51st Annual Conference 2020*: November 21-23, Proceedings, (pp. 205-215) Houston, TX: Decision Sciences Institute.
3. "Emotions in Social Media: An Analysis of Tweet Responses to MH370 Search Suspension Announcement", by Su Lin YEO, Augustine PANG, Michelle LF CHEONG, and Jerome YEO, (2020). *International Journal of Business Communication*, pp 1-19.
4. "Simulation Model to Evaluate Effectiveness of Queue Management Tool in Supermarket Retail Chain", by Michelle LF CHEONG and YQ CHIA, (2019).

International Conference on Industrial Engineering and Engineering Management, IEEE IEEM 2019, 15 to 18 December, Macau.

5. "Customer Level Predictive Modeling for Accounts Receivable to Reduce Intervention Actions", by Michelle LF CHEONG and Wen SHI, (2018). *Proceedings of the 14th International Conference on Data Science ICDATA 2018*, 30 July to 2 August, Las Vegas, Nevada.
6. "Emotions in Social Media: An Analysis of Tweet Responses to MH370 Search Suspension Announcement", by Su Lin YEO, Augustine PANG, Michelle LF CHEONG, and Jerome YEO, (2018). *The Association for Education in Journalism and Mass Communication 2018 Conference*, 6 to 9 August, Washington DC.
7. "Ad-Hoc Automated Teller Machine Failure Forecasting and Field Service Optimization", by Michelle LF CHEONG, Bharath CHANDRABABU, Ping Shung KOO, (2015). *IEEE CASE 2015*, 24-28 August, Gothenburg, Sweden.
8. Book Chapter: "Data Analysis of Retailer Orders to Improve Order Distribution" for the Springer's Series -- Annals of Information Systems (<http://www.springer.com/series/7573>), *Book Title: Reshaping Society through Analytics, Collaboration, and Decision Support: Role of Business Intelligence and Social Media*, (2015).
9. "A Sentiment Analysis of Singapore Presidential Election 2011 using Twitter Data with Census Correction", by Junyu CHOY, Michelle LF CHEONG, Nang Laik MA, and Ping Shung KOO, (2013). <http://arxiv.org/abs/1108.5520>
10. "US Presidential Election 2012 Prediction using Census Corrected Twitter Model", by Junyu CHOY, Michelle LF CHEONG, Nang Laik MA, and Ping Shung KOO, (2013). <http://arxiv.org/abs/1108.5520>
11. "Data Analysis of Retailer Orders to Improve Order Distribution", by Michelle LF CHEONG, Murphy CHOY, Nang Laik MA, (2013). *Analytics 2013*, London.
12. "Effective use of Data and Decision Analytics to Improve Order Distribution in a Supply Chain", by Michelle LF CHEONG and Murphy CHOY, (2013). *Teradata University Network (TUN) Teaching Innovation Award Winner 2013*.
13. "Adaptive Credit Scoring With Analytic Hierarchy Process", by Kwang Yong KOH, Junyu CHOY, and Michelle LF CHEONG, (2013). *12th International Symposium Of The Analytic Hierarchy Process*, Malaysia, KL, 06/2013.
14. "Demand Forecasting Using a Growth Model and Negative Binomial Regression Framework", by Cally ONG YERU, Junyu CHOY, and Michelle LF CHEONG, (2013). *SAS Global Forum 2013*, USA, San Francisco, 05/2013.

15. "Implementation of Slowly Changing Dimension to Data Warehouse to Manage Marketing Campaigns in Banks", by Lihui WANG, Junyu CHOY, and Lee Fong, Michelle LF CHEONG, (2013). *SAS Global Forum 2013*, USA, San Francisco, 05/2013.
16. "Identification of Demand through Statistical Distribution Modeling for Improved Demand" by Murphy CHOY and Michelle LF CHEONG, (2012). *Business Intelligence Journal* - July, 2012 Vol.5 No.2, 260-266.
17. "Uncovering Insights through Data Analytics for an Airport Operation to Improve Profitability", by Nang Laik MA, Michelle LF CHEONG, and Junyu CHOY, (2012). *SRII – Service Research and Innovation Institute*, 2012 San Jose, U.S.A, 07/2012.
18. "Data Analysis and Monte Carlo Simulation of Airport Check-In Process" by Nang Laik MA, Michelle LF CHEONG and Murphy CHOY, (2012).

d) Operations Management (2004 ~ 2014)

1. "Strategic Decision Support System using a Heuristic Algorithm for Practical Outlet Zones Allocation to Dealers in a Beer Supply Distribution Network", by Michelle LF CHEONG, (2014). *International Conference on Industrial Engineering and Operations Management (IEOM)*, Bali, Indonesia, January 7 – 9, 2014.
2. "A Greedy Double Swap Heuristic for Nurse Scheduling", by Junyu CHOY and Lee Fong, Michelle LF CHEONG, (2012). 2, *Management Science Letters*, Growing Science Ltd, 2001-201.
3. "Multi-party Multi-period Supply Chain Coordination", by Thin Yin LEONG and Michelle LF CHEONG, (2012). 10, 3, *International Journal of Industrial and Systems Engineering*, Inderscience, 300-318, United Kingdom.
4. "Logistics Network Design with Supplier Consolidation Hubs and Multiple Shipment Options", by Michelle LF CHEONG, R. BHATNAGAR, and S.C. GRAVES, (2007). Vol. 3, Special Issue, 1, *Journal of Industrial and Management Optimization*, AIMS, 51 – 69, 02/2007.
5. "Airfreight Pricing and Discounts for Dense and Volumetric Cargoes", by Michelle LF CHEONG, Bhatnagar, R.; Graves, S. C., (2006). *INFORMS International 2006*, Hong Kong.

6. "Logistics Network Design with Price Discount", by Lee Fong, Michelle CHEONG, R. BHATNAGAR, and S.C. GRAVES, (2005). *MSOM Conference 2005*, Chicago, USA.
7. "Logistics Network Design with Differentiated Delivery Lead Time: A Chemical Industry Case Study", by Michelle LF CHEONG, R. BHATNAGAR, and S.C. GRAVES, (2005).
8. "Logistics Outsourcing and 3PL Challenges", by Michelle L.F. CHEONG, (2004). <http://hdl.handle.net/1721.1/3908> or <http://dspace.mit.edu/handle/1721.1/3908>
9. "New Models in Logistics Network Design and Implications for 3PL Companies", *PhD Dissertation*, by Michelle L.F. CHEONG, (2004). <http://web.mit.edu/sgraves/www/papers/Michelle%20Final%20Thesis-Aug05.pdf>

Work-in-Progress

1. "Does Chain of Thought Prompting Improve ChatGPT's Performance in Spreadsheets Modeling Assessments?", by Michelle LF CHEONG (2023). – targeting Research and Practice in Technology Enhanced Learning **Cite Score = 5.9, 90th percentile under Education sub-category = Q1 in SCOPUS**
2. "Evaluation of ChatGPT Usage in Student Learning and Assignment Completion in a Spreadsheets Modeling Module", by Michelle LF CHEONG (2023).
3. "Spreadsheet Modelling and Data Analysis of Team Singapore's Performance at the Olympic Games", by Michelle LF CHEONG, Jonathan Zhiwei WONG, Cheryl Jeanne CHIEW, Enqing CHEE, Lin LIN, and Peh Yu TAN (2021).