

WERA International Research Network
Social Metacognition and Big Data Network

Yearly Progress Report
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Our IRN, Social Metacognition and Big Data Network, started to develop theoretical models by using artificial intelligence and advanced statistics to analyze complex, big data on 7 research topics: (i) young children's buddy reading; (ii) students' learning from feedback; (iii) discussions to improve teaching; (iv) primary technicians' problem solving; (v) mathematics problem solving forums; (vi) online debate justifications; and (vii) winning online debates. From May 2020 to April 2021, we produced 20 research outputs (including 8 journal manuscripts, 1 book chapter, 1 conference proceeding, 1 keynote speech, 6 conference presentations, and 3 news articles), were awarded 4 new grants on relevant themes, and submitted a symposium proposal for the WERA 2020+1 virtual meeting.

A. Research Outputs

(i) Young children's buddy reading

Through the news article below, we promoted awareness about linguistic minorities' language learning challenges and suggested that reading culturally relevant books can enhance their language and reading skills.

News Article (1)

- Chiu, M. M., Christ, T., & Chui, C.-Y. [Choosing books for minorities](#) (少數族裔選書有法) (January 19, 2021) *Ming Pao*.

(ii) Students' learning from feedback

Our studies found that effective feedback positively influenced students' motivation, academic achievement, learning outcomes, and enjoyment of learning.

Journal Articles (3)

- Ahn, I., Chiu, M. M., & Patrick, H. (in press). Connecting teacher and student motivation: Student-perceived teacher need-supportive practices and student need satisfaction. *Contemporary Educational Psychology*, 64.
- Yung, W. H. K., & Chiu, M. M. (in press). Factors affecting secondary students' enjoyment of English private tutoring: Student, family, teacher, and tutoring. *The Asia-Pacific Education Researcher*.

- Yan, Z., Chiu, M. M., & Ko, P. Y. (2020). Effects of self-assessment diaries on academic achievement, self-regulation, and motivation *Assessment in Education: Principles, Policy & Practice*, 27, 5, 562-583.

Conference Proceeding (1)

- Liu, S. H., Chiu, M. M., Wang, Z., & Lam, S. M. (2020, November). Using computer-like rules to give automatic grammatical written corrective feedback a case study of structural particles “的”, “地” and “得”. In *ICCE 2020-28th International Conference on Computers in Education Conference proceedings* (pp. 494-503). Asia-Pacific Society for Computers in Education.

Conference Presentation (1)

- Morita-Mullaney, P. M., Renn, J. E. & Chiu, M. M. (2020, October). *A Structural Matrix for Improving Secondary Outcomes in Dual Language Bilingual Education*. Directors' Meeting of the Office of English Language Acquisition, US government. Washington, DC.

News Article (1)

- Yung, K. W.-H., & Chiu, M. M. [Help students like tutoring!](#) (令子女喜歡補習吧!) (2020, June 2) *Ming Pao Education*.

(iii) Discussions to improve teaching

We modeled online discussions and analyzed the views of school principals and teachers. Our findings inform teaching and (remote) learning.

Journal Article (1)

- Choi, T. H., & Chiu, M. M. (2021). Toward equitable education in the context of a pandemic: supporting linguistic minority students during remote learning. *International Journal of Comparative Education and Development*.

Keynote Speech (1)

- Chiu, M. M. (2020, September). *Modeling online discussions*. Asia Productivity Organization. Manila (videoconference). **Keynote**

Conference Presentations (2)

- Wong, K. L., & Chiu, M. M. (March, 2021). *School and media influences on civic / citizen education: Views of secondary school principals and teachers in Hong Kong*. Paper presented at the 2021 Conference of The Comparative Education Society of Hong Kong. Hong Kong.
- Chiu, M. M. (2020, October). *Using Small and Big Data to Improve our Teaching: Tests, Essays, Discussions and Class Activities*. Asia Productivity Organization. Manila (videoconference).

News Article (1)

- Choi, T.-H., & Chiu, M. M. [Supporting distance learning for ethnic minorities](#) (支援少數族裔遙距學習) (2020, September 15) *Ming Pao Education*

(iv) Primary technicians' problem solving

We discussed how to improve team meetings and reduce negativity in the following book chapter:

Book Chapter (1)

- Gerpott, F. H., Chiu, M. M., & Lehmann-Willenbrock, N. (2020, March). Multilevel Antecedents of Negativity in Team Meetings: The Role of Job Attitudes and Gender. In *Managing Meetings in Organizations*. Emerald Publishing Limited.

(v) Mathematics learning

The following three journal articles discuss the association between language and mathematics outcomes, the relationship between early home numeracy activities and the later mathematics achievement, as well as the importance of teacher's discourse in supporting student's mathematical reasoning.

Journal Articles (3)

- Morita-Mullaney, P. M., Renn, J. E. & Chiu, M. M. (in press). Contesting math as the universal language: A longitudinal study of dual language bilingual education language allocation. *International Multilingual Research Journal*.
- Zhu, J. & Chiu, M. M. (in press). Early home numeracy activities and later mathematics achievement: Early numeracy, interest, and self-efficacy as mediators. *Educational Studies in Mathematics*. DOI: 10.1007/s10649-019-09906-6
- Xin, Y. P., Chiu, M. M., Tzur, R., Ma, X., Park, J. Y., & Yang, X. (2020). Linking Teacher-Learner Discourse With Mathematical Reasoning of Students With Learning Disabilities: An Exploratory Study. *Learning Disability Quarterly*, 43(1), 43-56.

(vi) Online debate justifications

We examined how social antecedents impact students' use of justifications in online debates in this journal article:

Journal Article (1)

- Chiu, M. M., & Jeong, A. (2020). Gender, social distance, and justifications: statistical discourse analysis of evidence and explanations in online debates. *Educational Technology Research and Development*, 68(3), 1199-1224.

(vii) Winning online debates

Our study below provides evidence to support the use of specific strategies for structuring and sequencing the argumentation task to generate larger numbers of premises to achieve a deeper and more thorough analysis of problems and claims in online debates.

Conference Presentation (1)

- Jeong, A., & Chiu, M. M. (April, 2020). *Production blocking in brainstorming arguments in online group debates and asynchronous threaded discussions*. [Paper session] Annual Meeting of the American Educational Research Association. San Francisco.
<http://tinyurl.com/vuw9gu2> (Conference Canceled)

(viii) Others

Apart from the above outputs, we also made two presentations on artificial intelligence and big data at international conferences in Hong Kong and Thailand.

Conference Presentations (2)

- Chiu, M. M. (2020, November). *Applying Artificial Intelligence & Statistics to Big Data: Automatic Analysis of Conversations*. Frontiers in Medical and Health Sciences Education: Medical Education Disrupted – Negativity or Creativity. Hong Kong.
- Chiu, M. M. (2020, February). *Applying Artificial Intelligence to Big Data*. International Conference on Education. Udon Thani, Thailand.

B. Grants

We promoted our IRN through collaboration with researchers with expertise in different areas and won four new grants about social metacognition and big data during this reporting period.

- *Geometry and the shape of things to come: The Hero's Journey*. Quality Education Fund, Hong Kong. USD73,320, 2021-2023
- *Harnessing the power of teacher feedback to enhance learning outcomes: The roles of students' feedback orientations and learning engagement*. General Research Fund, Research Grants Council, Hong Kong. USD60,726, 2021-2022
- *K-12 Teacher Response to COVID-19-Induced Emergency Transition to Remote and Online Teaching and Learning in the State of New Jersey*, Center for COVID-19 Response and Pandemic Preparedness, USD30,000, 2020-2021
- *Establishing a research cluster for promoting artificial intelligence in technology-enhanced language learning (AITELL) research*. Research Cluster Fund, The Education University of Hong Kong, Hong Kong. USD44,872, 2020-2022

C. Symposium

Our IRN submitted a symposium proposal for the WERA 2020+1 virtual meeting. The symposium consists of four paper presentations:

- Jeong, A., & Chiu, M. M. *Production Blocking in Brainstorming Arguments in Online Group Debates and Asynchronous Threaded Discussions*.
- Bakhoda, I., Christ, T., Chiu, M. M., & Cho, H. *Teacher and Students Mediation in Book Discussions within an Emergent Bilingual Instructional Context*.

- Zhan, Y. *What matters in design? Cultivating undergraduates' critical thinking through online peer assessment in a Confucian heritage context.*
- Lehmann-Willenbrock, N., & Gerpott, F. H. *Life in temporal sequence: Capturing team interaction patterns and emergent leadership.*