Action Research for Enhancing Teaching and Learning

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Co-Facilitator: LIM Xin-Xiang
Principal Facilitator: LAM Siew Hong

NUS National University of Singapore

DBS Department of Biological Sciences

Rationale & Aims

1. **Improve** Teaching and Learning Practices
2. **Capture and Provide** Evidence-based Effectiveness of Teaching and Learning
3. **Contribute** to Our Professional Development
4. **Support** the Embarking and Continuing of Education Research
5. **Encourage** Collaborative Education Research
6. **Enhance** Research Quality and Output

Organisation

Survey conducted and identified Action Research Interests

Engagement
Wu Jinlu
Maxine Mowe
Chua Siew Chin
Matthew Lim

Assessment
Amy Choong
Zeehan Jaafar
Theresa Su
Ian Chan

AI & Technology
Lam Siew Hong
Lim Xin Xiang
Robert Lieu
Shawn Lee

Activities & Timeline

Jan – Mar 2024
1. Observe & Reflect
2. Identify Problem & Propose Solution

Apr – May 2024
3. Design Action Research Plan

June – July 2024
4. Implement Action Plan & Collect Data

Aug – Dec 2024
5. Analyze, Evaluate & Communicate

Jan – Apr 2025
6. Round 2 Implement Action Plan & Collect Data

May – June 2025
7. Round2 Analyze, Evaluate & Communicate

Learning Community

E-Resources

ACTION RESEARCH in Teaching and Learning

Action Research in Education

The BERA/SAGE Handbook of Educational Research

To date: We have had 11 meetings and another 4 meetings scheduled

Research Projects Launched

Project Launched in Sem 1 AY2024-25
1) Wu Jinlu, Maxine Mowe, Chua Siew Chin, and Matthew Lim: 3-2-1 Teaching tool for engaging large classes in higher education
2) Theresa Su and Zeehan Jaafar: Reflective learning - The use of mind maps in biodiversity courses
3) Lim Xin Xiang: Evaluating the effectiveness and classroom design of GenAI for interdisciplinary learning
4) Ian Chan: Diversity of opinion in collaborative learning enhances student learning
5) Amy Choong: Helping students to design better posters for the Natural Heritage classes
6) Robert Lieu: The use of the 4W1H formula to improve student writing of experimental results and discussion

Project Launched in Sem 2 AY2024-25
7) Lam Siew Hong and 12 other members: GenAI & U Students
8) Shawn Lee: Evaluating the integration of Virtual Reality into STEM courses

Outcomes

8 Projects (3 Teams) (5 Individuals)   **10 Conference Papers**   **1 Submitted Journal Paper** (under review)

Lim. X.X. (2025). Designing Active Learning Environments for Enhancing Interdisciplinary Learning. Southeast Asian Conference on Education (SEACE2025), 21-25 February 2025, Kuala Lumpur, Malaysia.

Lim, X. X. (2024). Harnessing generative AI as a personalised tutor: Enhancing interdisciplinary learning outcomes for biotechnology graduate students. In Higher Education Conference in Singapore (HECS) 2024, NUS, Singapore.

Choong M.F. Amy. (2024) Poster design and presentation assignment can engage the students and community to help overcome plant blindness. In Higher Education Research and Development Society of Australasia HERDSA 2024 Conference, Adelaide, Australia 8-11 July. Also presented in Higher Education Conference in Singapore (HECS) 2024, NUS, Singapore

Mowe Maxine, Wu J, Chua SC (2024) Does the 3-2-1 method improve student engagement in class? Using generative AI to analyse university student responses in a large biology course. In Higher Education Conference in Singapore (HECS) 2024, NUS, Singapore.

Mowe Maxine (2024). Using Instagram to teach science communication in an aquatic ecology course for undergraduate students: strengths and pitfalls. In 5th International Conference on Tropical Limnology at the Siliman University, Philippines

Su T. L., Xu W. & Jaafar Z. (2024). Reflective learning: the use of mind maps in biodiversity courses [Lightning talk]. In Higher Education Conference in Singapore (HECS) 2024, NUS, Singapore

Tan, A.L., Su, T., Seow, T., Tay, W.B., Yong, A., & Tan, J. (2024) Immersing students in nature: does informal learning experiences in the natural environment support interest and knowledge development [Paper presentation]? In International Science Education Conference (24–26 June 2024), Singapore.

Zeehan Jaafar (2024) Ideation to Implementation: A Critical Evaluation of the Development of an Interdisciplinary Course; In International Science Education Conference 24-26 June 2024, National Institute of Education, Singapore.

Chan Z.W. Ian. (2024) Promoting Diversity of Opinion in Collaborative Learning Enhances Student Learning on Conservation. In Asian Conference of Education 2024, Tokyo, Japan on 25-29 November 2024.

LAM Siew Hong, LIM Xin-Xiang, CHAN Ian Zhi Wen, CHOONG Amy Mei Fun, CHUA Siew Chin, JAAFAR Zeehan, LEE Shawn Ming Yang, LIEU Robert Zi Zhao, LIM Mathew Lek Min, MOWE Maxine Allayne Darlene, SU Theresa, WU Jinlu. The 'will', 'skills', and 'thrills' of discipline-based education research to enhance teaching and learning: A reflection on the challenges and possible solutions from a learning community. (Under Review)

Learning Points

Ian Chan
The discussions with my colleagues have helped me to see new avenues for doing pedagogical research.

Lim Xin Xiang
Advancing educational research collaboratively fosters teamwork, shared purpose, and strengthens collective commitment to improving student learning outcomes.

Theresa Su
Learning and sharing in this Learning Community has made me a more reflective educator.
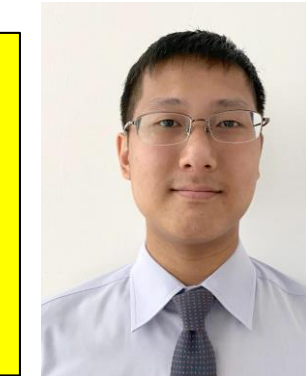
Shawn Lee
I am more motivated to develop my own pedagogical research further, and also more informed about the processes and considerations
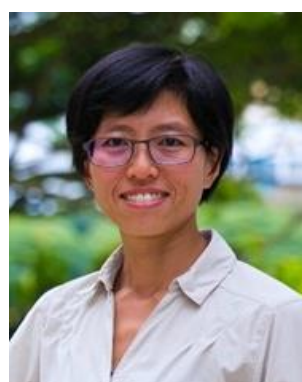
Matthew Lim
3-2-1 prompt can help me and my students to think about what they have learnt, and which topics matter to them individually.
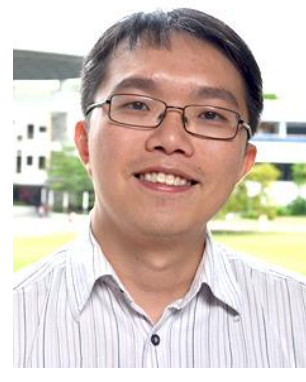
Maxine Mowe
The learning community was a place of sharing ideas about teaching and I gained a great deal of insight and knowledge about how to engage large classes from fellow peers

Chua Siew Chin
Iterative feedback from students via post lecture activities (3-2-1 prompt) strongly informs me of gaps in my teaching.

Robert Lieu
Participating in this LC has exposed me to the teaching practices that my colleagues used and has been useful in increasing my repertoire of teaching strategies.

Zeehan Jaafar
The LC has provided a dedicated platform to share ideas and discuss opportunities in biology-specific education research

Amy Choong
I learnt about the various action research methodologies and topics. Some of them may be adapted to my own classes.

Wu Jinlu
It was a valuable collaborative learning experience that inspired me to balance academic rigor with a more engaging classroom environment.

Lam Siew Hong
I learned that collaborating with colleagues is a great way to enhance quality of research and it is also more meaningful and fun! This Community has brought us closer and lift us higher!