



# METACOGNITION

A Journey in Science Education (1985 – Present Day)

*Gregory P. Thomas PhD*

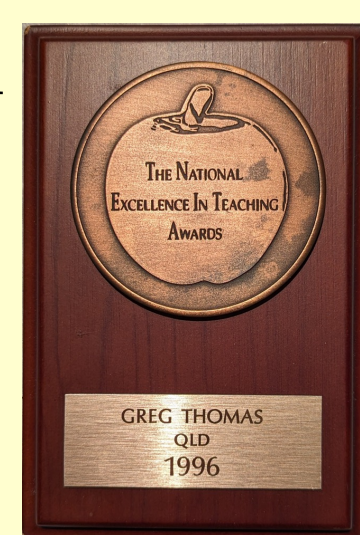
1985 – First learning about metacognition in a science methods class (and so it begins...)

1988 – Science Teaching Career started (Canberra Boys Grammar School, Canberra)

1993 – MEdSt, Monash: “*An investigation into the transfer of cognitive strategies*”

1991 – A Thinking Course in Science (Xavier College, Melbourne)

1996 – Multimodal Classroom Design and Pedagogy (Immanuel College, Buderim, Queensland)



1997 – Left High School Teaching → Queensland University of Technology (QUT), Centre for Mathematics and Science Education (Brisbane, Australia)

1999 – The University of Hong Kong (Assistant Professor)

1999 – PhD, QUT: *Developing metacognition and cognitive strategies through the use of metaphor in a year 11 chemistry classroom*

2002 – The Education University of Hong Kong (Professor)

2007 to Present – The University of Alberta (Professor)

## Selected Publications

- Thomas, G. P., & McRobbie, C. J. (2001). Using a metaphor for learning to improve students' metacognition in the chemistry classroom. *Journal of Research in Science Teaching*, 38(2), 222-259.
- Thomas, G. P. (2003). Conceptualization, development and validation of an instrument for evaluating the metacognitive orientation of science classroom learning environments: The Metacognitive Orientation Learning Environment Scale – Science (MOLES-S). *Learning Environments Research*, 6(2), 175-197.
- Thomas, G. P., Anderson, D., & Nashon, S. (2008). Development of an instrument designed to investigate elements of students' metacognition, self-efficacy, and learning processes: The SEMLI-S. *International Journal of Science Education*, 30(13), 1701-1724.
- Thomas, G. P., & Anderson, D. (2012). Parents' metacognitive knowledge: Influences on parent-child interactions in a science museum setting. *Research in Science Education*, 43(3), 1245-1265.
- Thomas, G. P. (2012). Metacognition in science education: Past, present and future considerations. In B. J. Fraser, K. G. Tobin, and C. J. McRobbie (Eds.), *Second International Handbook of Science Education* (pp. 131-144). Springer.
- Thomas, G. P. (2017). 'Triangulation': An expression for stimulating metacognitive reflection regarding the use of 'triplet' representations for chemistry learning. *Chemistry Education Research and Practice*, 18(4), 533-548.
- Thomas, G. P., & Boon, H. J. (Eds.). (2023). *Challenges in science education: Global perspectives for the future*. Palgrave Macmillan.
- Thomas, G. P. (2023). Who are the students in metacognition research in high school science education? Reflections on ecological validity, representative design, and generalizability. In S. Larkin (Ed.), *Metacognition in education: Future trends*, (pp. 28-44). Routledge.

## Selected Grants

- SSHRC – (2021-2023). *Using audio-podcasts and supporting text materials to stimulate metacognitive experiences in pre-service science teachers regarding metacognition and its development*. (Principal Investigator) (\$53,352)
- TLEF (Teaching and Learning Enhancement Fund, University of Alberta). – (2011-2014). *Transforming the undergraduate physics laboratory: A guided inquiry approach*. (Co-investigator with Professor Al Meldrum, Principal Investigator) (\$137,579)
- SSHRC – (2008-2011). *Using metaphor to develop metacognition in relation to scientific inquiry in high school science laboratories*. (Principal Investigator: Professor David Anderson, UBC, Co-I) (\$101,000)

## Selected Awards

- 2017 – Best Paper Award. *International Conference on Open and Innovative Education*. Thomas, G. P., & Meldrum, A.
- 2011 – Outstanding Paper Award. *AERA (Learning Environments SIG)*. Thomas, G. P. & Anderson, D.
- 2000 – Outstanding Paper Award. *AERA (Learning Environments SIG)*. McRobbie, C. J., & Thomas, G. P.

## Visiting Scholar (Selected)

University of British Columbia (Canada), South China Normal University (China), Khon Kaen University (Thailand), The University of the Free State (South Africa), University of Pretoria (South Africa), Aarhus University (Denmark), The Education University of Hong Kong (China).

**Metacognition – An Individual's Knowledge, Control, and Awareness of their Thinking and Learning Processes**