ERFP Sharing

REFLECTIONS ON WRITING GRANT PROPOSALS

Research project

Title: Identifying and assessing integrative STEM competencies for secondary school students in Singapore

Research Questions	Methods
What are the key integrative STEM competencies that secondary school students need to develop?	Delphi method on SMEs
How can these integrative STEM competencies in students be assessed through a learning progression approach?	Design and administer tests to one school. Validate the LP.
How can the development of these integrative STEM competencies be integrated within the school curriculum?	Interview teachers and SLs

Research Team:

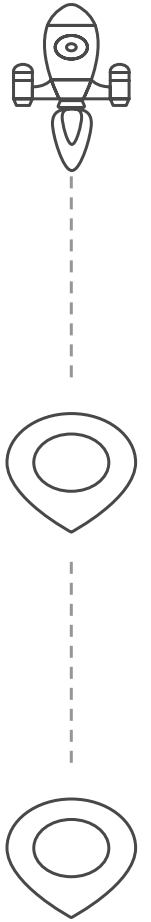
PI/co-PIs: Chue Kah Loong (PCHD), Choy Ban Heng (MME), Pan Qianqian (OFR), Lin Rongchan (LSA)

MOE: Darren Wong (CPDD), Liew Poh Yin (CPDD), Charlene Seah (CPDD), Mohd Hafiz (CPDD)

Reflections on grant writing

3. Addressing Reviews

Responding to feedback and making revisions



2. Writing

Crafting a clear, effective proposal

1. Initial Preparation

Gathering necessary resources to start

Initial preparation

- 2021 NIE-MOE Ideation session (Topic: assessment)
- 2022 NIE-MOE Ideation session (Topic: STEM competencies)
- 2022 Follow up meeting from ideation session (Developed RQ, review, and methods)
- 2022 – 2023 Team formation
- 2023 Submission of grant proposal (revise and resubmit)
- 2024 Re-submission of grant proposal (accepted)

Writing

Significance and impact

- What is the contribution to Singapore's education system?
- Why should MOE care?

The current project is timely as the future workforce is increasingly reliant on STEM achievements and advancement (Teo & Choy, 2021).

The process also has the potential to serve as a model for assessment of other STEM outcomes.

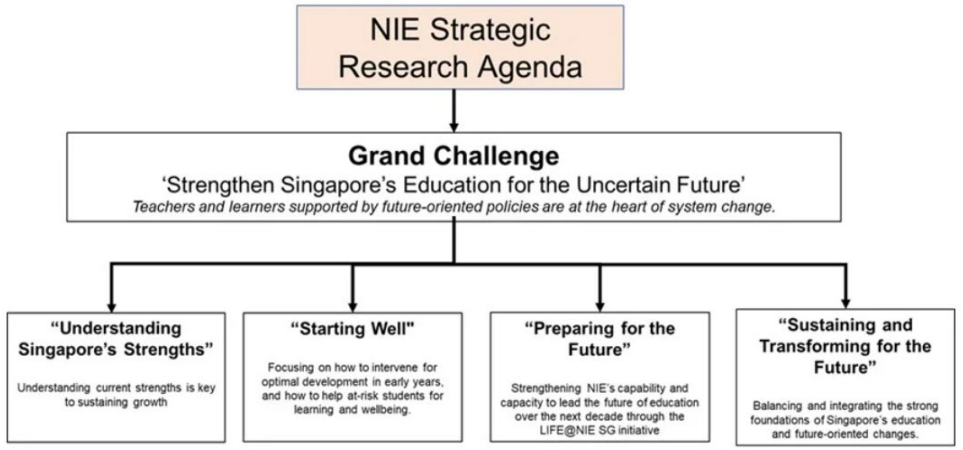
... the progressions would further inform the WOTD developmental map developed by the science unit in MOE (CPDD, 2020).

Writing

Relevance

- How does the research align with MOE/NIE's research priorities?

Future of Learning	How to equip students with competencies and qualities to thrive in the future with particular emphasis on deepening MOE efforts in 21CC development and harnessing technology for learning, including: • How to develop and assess priority 21CC such as cognitive and social adaptability, resilience to negotiate uncertainty and disruption, empathy and civic literacy • Intersections between learners' cognitive competency and social & emotional competency, and how both domains can synergistically support learning



Disciplinary and integrative STEM learning approaches

Lines of Inquiry

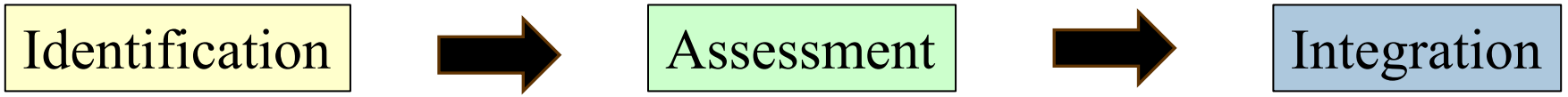
An investigation of disciplinary and integrative learning approaches in STEM, specifically focusing on:

1. The integrative approaches co-existing with disciplinary approaches (formal and out-of-school) that can help students make connections between and among the STEM subjects;
2. How integrative learning experiences should be designed and built upon the disciplinary foundations to help students make connections between and among disciplinary ideas and/or practices; and
3. The extent that integrative learning approaches support high-level, cross-domain abilities rooted in the STEM subjects in relation to disciplinary-focused approaches (e.g., D&T pedagogical principles).

Writing

Coherence

- Are the links between the different studies and research questions explicitly stated?



The first step in phase 2 will be to select a key STEM competency from the results of phase 1.

The final stage (of phase 2) focuses on the utility of the progression to guide instruction and assessment. Interviews will be conducted…. In phase 3, interviews will be conducted within the school that was selected in phase 2… The interviews will emphasize on ways in which the learning progression can be aligned with and integrated within the school's curriculum.

Writing

Feasibility

- Are your methods clearly detailed?
- How can you convince MOE that the project can be delivered?

Methods: 1918 out of 5868 words = 32.7% (pages 10 – 16)

- Delphi method (Okoli & Pawlowski, 2004)
- Learning progression validation and assessment (Graf et al., 2021)
- Sample size, data analytical methods etc.

Competitive/Comparative Advantage of the Research Team

- Experience in leading research teams
- Different expertise
- Links with schools

Addressing reviews

Expectations

- Do you have a clear idea of what can or cannot be done?

Points of contention

- Integration into curriculum
- Systematic review
- Expanding to more than one competency

Last reflection

Don’t be shy to ask for help. ☺

Thank you!