Project Summary for IAL Website

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Project Title:	Dialogical Inquiry: Developing Quantitative Instruments for Profiling Future-oriented Capabilities
Project Number:	GA20-09
Year of Approval:	2021
Funding Source:	WDARF
Objectives and intended outcomes of the project:	This project brings together two fields of research that rarely work together – social psychology and a socio-cultural perspective, both within the field of adult learning. In a small way, this project provides a means to make visible the assumptions, theoretical stances, and units of analysis embodied in the logic of various epistemological, ontological approaches that are otherwise assumed and, thus, silent. The project will move beyond multi-disciplinary research towards a transdisciplinary approach in the field of the science of adult learning, in Singapore and around the world.
Project Team	
Principal Investigator:	Albert (Kai Chung) Lee
Summary of Project (up to 300 words)	

This project concerned the development and validation of the Processes of Deep Learning Scale (PDLS), a quantitative, diagnostic toolkit for learning. Conceptualization was grounded in the Map of Dialogical Inquiry, a theoretical framework of deep learning involving eight distinct learning facets. Through PDLS, users can profile learning at an individual or institutional level, track and compare learning progress in a timely and precise manner to foster the development of future-oriented capacities.

The PLDS followed standard procedure of scale development (e.g., Carpenter, 2018), including psychometric steps such as (1) reducing facet numbers, (2) detecting dimensions underlying each facet (3) examining underlying relations among facets, (4) evaluating reliability and validity of items. Using samples from Singapore, we demonstrated internal consistency, alongside convergent and divergent validity. We established external validity by testing PDLS in authentic educational contexts in Singapore where real learning occurs. We directed effort to show applicability in culturally distinct countries.

The PDLS is impactful in three categories. First, it helps strengthen pedagogical transparency, allowing users in diverse educational and professional settings to numerically track, communicate, and compare the strengths or weaknesses in specific learning facets. This allows interventions to be implemented in a timely, specific manner. Second, PDLS enables benchmarking and profiling of learning in large scales by analyzing groups longitudinally over time, cross-sectionally between groups at a single time point, or both. Third, PDLS contributes to a paradigm shift in Singaporean society, gradually replacing over-simplistic, outdated views of learning by a nuanced, multi-dimensional perspective. Such recognition helps promote a scientifically informed, supportive, resilient, and holistic environment for diverse ways of learning, which echoes the foundational mandates of IAL and MoE.

Summary of Project Findings, Deliverables and Impacts (up to 500 words)

Through this project, the team developed and validated the Processes of Deep Learning Scale (PDLS), a 40-item diagnostic toolkit that decomposes learning into eight facets. Conceptualization was guided by the Map of Dialogical Inquiry, a framework of deep learning.

Project Findings: Development began with a large item pool generated from extensive literature review in education and social psychology. Using Exploratory Factor Analysis (EFA), we confirmed the predicted eight-factor solution aligned with the Map. Through Confirmatory Factor Analysis (CFA) and tests of convergent and discriminant validity, we established that PDLS demonstrates (1) strong internal consistency and (2) strong positive correlations with conceptually-related constructs, but not with conceptually-unrelated constructs. Taking PDLS to authentic educational contexts, we demonstrated external validity by showing the toolkit's ability to evaluate and compare changes in learning facets within Singapore university classrooms. Finally, addressing the importance of cultural generalizability, we directed effort to show applicability in countries that are distinct from Singapore in demographics, cultural values, and education systems.

Deliverables: Main deliverables include a diagnostic toolkit of PDLS, and an empirical database of learning facets across diverse demographic (e.g., ethnic, age, gender) and professional (e.g., full-time vs. part-time employment, in transition, inactive) communities in Singapore. Deliverables also include a set of policy recommendations for individualized feedback on learning, curriculum design, and assessment, alongside a manuscript currently in preparation for publication.

Impacts: The PDLS transcends traditional metrics by translating a theoretical framework of deep learning into a unifying, high-definition diagnostic toolkit. By deconstructing and numerically representing learning into eight facets, PDLS provides a vehicle to move Singapore from standardized models of learning towards personalized learning experiences. Impacts are classified into three categories.

1. Pedagogical Transparency: The PDLS serves as a precision lens for curriculum designers, drawing their attention to a fuller range of learning facets rather than a narrow subset. Because PDLS is easier to give and take, users can track progress across eight learning facets and update teaching approach and evaluation tools in a timely, precise manner. For example, if PDLS reveals a deficit in "Analytic," instructors and learners can specifically adjust the learning environment to address that gap.

2. National Benchmarking and Profiling: Integrating PDLS into institutions creates a systematic profiling database of learning for Singapore. This allows for large-scale, longitudinal tracking of how various demographics—from students to mid-career workers—navigate deep learning over time. PDLS also provides cross-sectional analyses, such as comparing two groups of learners across schools. Beyond educational contexts, PDLS provides numerical clarity to identify where the workforce is thriving, or where support mechanisms should be implemented to address specific facet weaknesses.

3. Shifting Public Paradigms: The PDLS helps debunk the myth of the "monolithic learner." By promoting a nuanced, scientific view of learning facets, PDLS empowers the public to see flaws not as total failures, but as targeted areas for growth. Such recognition fosters a supportive, resilient, and holistic environment that values the diverse ways of learning, which corresponds to the core themes of IAL and overarching educational philosophy of MoE.