COMPLETION REPORT

Integrated Studies in Japan: A model for culturally relevant science teaching and learning for Malaysia and Indonesia

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This research seeks to answer the main research aim - to identify practices that enable all students to learn science meaningfully. Based on the five research objectives (RO) of the study the following findings were found:

RO 1: The main findings from the literature systematic review on Fund of Knowledge a) is an effective pedagogical
tool to support under-served students by connecting the curriculum to rich-culturally based out-of-school activities; and b) focusses more on family practices and daily lives experiences which are sensitive to students' local context. One of the courses in Japanese education system- Periods of Integrated Studies (PIS) reflect the characteristics identified in the systematic review.

RO2: Based on the site visits, observations and interviews on the teaching and learning in selected Japanese schools, the Lessons learnt were: (1) Students are empowered to direct their own learning through inquiry and problem- solving activities that were community based, and (2) Principal plays a significant role in planning a holistic course of PIS- thus resulting an active school-parents-community engagement that lends to Culturally Responsive Science Teaching (CRST). This pedagogical approach draws on the strengths and the resilience of the families and cultures of students from diverse racial, ethnic, families, and social class aims to close the achievement gap between main streams and students who are marginalized within the schools.

RO3: Based on the trial of CRST lesson plans that incorporate FoK and inquiry activities, the major findings were
(1) Teachers realized that CRST and integrating FoK in teaching does assist students' understanding – however, teachers' repertoire of FoK themselves is limited and (2) Congruency of FoK between teachers and students requires urgent attention – due to generation gap – resulting misunderstanding in students due to ineffective use of FoK.

RO4: The effectiveness of the developed CRST and inquiry lesson plans on the students' process skills acquisition was measured through classroom observation, students' interview and science process skills tests. It was found that
(1) Students' interest in science lessons and level of science process skills increased, and (2) Students' demand for continuation of this approach, however, teachers lack the confidence in CRST approach.

RO5: Finally, this research presents a framework of CRST for Malaysia and Indonesia that is is characterized by a number of different elements. It uses the students' (i) prior knowledge/experiences, (ii) FoK, (iii) contextual teaching and learning, and (iv) make culturally relevant teaching possible in the science classroom. Each element plays an important role to make learning encounters more relevant to and effective for them.

Finally, action for future: (1) Generation gap may hinder in using FoK effectively in science teaching and learning. Thus, identification of FoK and elements from the framework must be part of pre and in-service teacher education programs, and (2) Principals, teachers and community strategic collaboration is necessary for an effective CRST. Thus, school leaders need to be trained for creating strategic collaboration.

Publication of the Results of Research Project:

Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)

1. November 29 - December 02, 2018, National Dong Hwa University, Hualien, EASE Conference.
   Title of presentation: Inquiry Process in Science: An Analysis of Japanese Primary School Science Textbooks.
   Presenter: Murni Ramli

2. December 07, 2019, Saphir Hotel, Jogkajarta, The 1st International Conference on Technology, Education and Science, Innovation Strategies: Industrial Revolution from 4.0 to Society 5.0, Universitas Siswa Taman, Jogjakarta,
   Title of presentation: Equity, Society 5.0 and Education: Some insights,
   Presenter: Lilia Halim

Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

1. **Title of thesis**: Learning Design of Funds of Knowledge to enhance students' scientific process skills and conceptual understanding of Environmental Problems,
   Author of thesis: Alfiani Indah Pratiwi, Master student, Science Education Department, Universitas Sebelas Maret, Surakata, Indonesia, 2020
2. **Title of thesis**: A case study exploring the relationship between teachers' use of CRSP and students' engagement in science inquiry-based learning.
   Author of thesis: Justin Tukau Jalak. 2019.
3. **Title of Thesis**: Kesediaan, Efikasi Kendiri Dan Jangkaan Hasil Pengajaran Guru Sains Terhadap Pedagogi Responsif Budaya (Readiness, Self- Efficacy and Outcome Teaching Expectation of Science Teachers Towards Culturally Responsive Pedagogy).
   Author of thesis: Ghazali Sabudin, Master students. Faculty of Education, UKM, 2020

Journal

1. Ghazali Sabudin & Lilia Halim (2020) Systematic study: Teaching approach and Impact of Funds of Knowledge in Science Learning. Jurnal Pendidikan Sains dan Matematik Malaysia, 21-38
2. Justin Tukau Jalak and Nurfaradilla Mohamad Nasri (2019) Systematic Review: The Impact of Culturally Responsive Pedagogy on Equity in Science Education at Rural Schools. Creative Education. 10(12):3243-3254

Book (Publisher and Date of the Book, Title and Author of the Book, etc.)

We have secured a contract with Routledge Publisher, Singapore- Publication date will be March 2022

Title of the book : Culturally Responsive Science Pedagogy in Asia: Status and Challenges for Indonesia, Malaysia and Japan.
This is going to be an edited book. The main authors of book chapters are the researchers involved in the research awarded by Sumitomo Foundation. We also invited two other experts in Culturally Responsive Science pedagogy- to meet the
requirement of the book reviewers.