Abstract

This paper is part of a bigger research with three cycles of reflective studies to identify essential attributes in validating transdisciplinary models to manage innovation processes, skills training and human resource development through "Learning Science/Mathematics Together" in a borderless world [LeSMaT(Borderless)] using technology. During the pilot phase or first cycle, the innovation processes of Knowledge, Thinking, Incubation, Inspiration and Development are reported involving secondary learners participating in Problem-based Learning using Scaffolded Instruction (PBL-SI) approaches. These are supported by POSITIVE monitoring/evaluation rubric to guide them involving Planning with Objective/ organisation, Skills development, Information/ resource procurement, Training/ transferring skills, Involvement/ incorporating Pedagogical-Content-Knowledge (PCK), emphasising Values/attitudes/ motivation and Evaluation/exchange/enrichment/ exposure. The lessons learnt from the pilot phase anchored on
sociocultural/constructivist framework were adapted in the second phase to facilitate LeSMaT(Borderless) using various sustainable blended learning platforms for managing knowledge, innovation processes as well as developing thinking, technology and life (work/survival/entrepreneurial) skills. In the subsequent phase, case exemplars are reported with highlights on recently implemented Smart PLS in-service skills training workshop to validate research instruments/models that promote scenario-based Education for Sustainable Living (ESL). Implications and future direction of research are also deliberated.

References

September, 2016. Penang: SEAMEO RECSAM.
- K. T. Ng, L. Toh, and M. L. Boey, 2014. Building LAMS supported blended-mode borderless learning communities: Challenges in promoting thinking skills and attitudes for sustainable living. Practitioner presentation in 9th International LAMS and Learning Design Conference with theme "Innovation in Learning Design", November 26-27, 2014, hosted by the Lee Kong Chian School of Medicine, a partnership between Nanyang Technological University (NTU) and Imperial College London, at the main campus of NTU, Singapore.

- K. T. Ng, 2016. Promoting Education for Sustainable Living (ESL) through blended learning platform: An introduction to useful digital tools for networking activities. Workshop presentation in conjunction with International Conference on Education for Sustainable Development (ICESDev), 26th October 2016 at SEAMEO RECSAM.
- K. T. Ng, 2016. Developing Open and Distant Learning (ODL) modules and tools to promote ESD and values-based education. Presentation during the colloquium organized in conjunction with Critical Success Factor (CSF) workshop 1/2016, 24th May at RECSAM.
- P. L. Montecillo, K. T. Ng, B. Baharulnizam, T. Suhaidah, M. L. Boey, and R.


- Y. S. Ch'ng, L. Toh, H. L. Woo, K. T. Ng, and T. Suhaidah, 2015. Reviving mathematics/science learning culture supported by digital platforms to promote sustainable energy education for all. Poster proposal presented in the 6th CoSMEd and won Best Poster Award (Gold and Champion) (Digital category). Penang: RECSAM.


- Y. F. Lay, K. T. Ng, S. Parahakaran, Y. S. Ch'ng, Y. Y. Ng, and J. H. Ng, 2016. Examining learners&apos; views about values-based sustainable energy education (VABSEE) supported by e-platforms with case exemplars. &apos;Research&apos;; category (Silver award) presented in Pertandingan Penyelidikan dan Rekacipta UMS (PEREKA) 2016.
September 27-28, 2016 at Kompleks Dewan Kuliah Pusat Ke-2, Universiti Malaysia Sabah (UMS), Kota Kinabalu, Malaysia.

- K. T. Ng, 2013. Promoting investigative research through blended learning with development of instructional materials. Phase 2 SEARCH project and workshop (17th to 22nd May 2012) report funded by RECSAM’s short-term research grant. Penang: SEAMEO RECSAM.


**Index Terms**

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Information Science
Keywords
Transdisciplinary Models  Process Integration Technology  Reflective Practices  Skills Innovations