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Proposing Curriculum and Learning Environment Development for Global Liberal Arts Education Incorporating Future Work Skills

Tosh YAMAMOTO[a*], Juling SHIH[b], Chris PANG[c], Benson ONG[c]
[a]*The Center for Teaching and Learning, Kansai University, Japan*
[b]*Department of Information and Learning Technology, National University of Tainan, Taiwan*
[c]*School of Business Management, Nanyang Polytechnic, Singapore*

*ctltosh@kansai-u.ac.jp

Abstract: This paper proposes a "de facto" standard curriculum for Tesseractive© and Global Liberal Arts Education harnessed with ICT-enhanced learning environment targeting at global students' audience, i.e., future generation that will be fully ready for Singularity in 2045. The purpose of the research is to develop a robust curriculum and associated contents to foster the future work skills for all stakeholders in the global society involving university students, adults with various ages in different social strata. In other words, in such curriculum, all stakeholders will learn together, where the younger generation can have dialogs with different generations as if they were discussing with themselves in the future, and the older generations can have dialogs as if they were discussing with themselves in the past when they were young. In this way, transcendence of cultural values, heritage, wisdom, and experiences in the human civilization will be guaranteed for the benefit of the future global society. Such a multi-facet curriculum involving all stakeholders will be designed across the border of the campus along with the society, as well as beyond the borders of nations. In addition to the curriculum and its related contents, this research proposal also includes the development of the learning environment for its learning environment, applying Jupyter notebook, Jupyter Hub, and Git Hub technologies at the level of simulation learning while guaranteeing Academic Integrity issues. The bird's eye view of the entire research will be shared in the form of a poster.

Keywords: Global Liberal Arts Education, Curriculum Development, ICT-enhanced AGILE learning environment, transcendence in learning

1. Introduction

As in the ABET Model of education, the four years of the university curriculum bears the responsibility of raising the future generation that will strive for their life-long dream and contribute to the global society. Unfortunately, the current curriculum in the educational paradigm today is based on the Prussian (German) Educational System developed in 1806 (https://feltd.wordpress.com/2010//09/16/ the-prussian-german-educational -system/). As a matter of fact, a Princeton University professor, in his book titled, "The Case Against Education", Bryan Caplan, claims that the current education System is a waste of time and money. Such a curriculum or educational paradigm will only give rise to unemployment when graduates face the Singularity in 2045. Thus, a paradigm shift in education is a must. Changes toward the Singularity are already shifting outside the world of the university curriculum and the corporate-level human resources training workshop.

It should be emphasized that this project demonstrates an execution of active and Tesseractive© learning in the form of Project/Problem-Based Learning in Global AGILE Teams.

2. Rationale behind the Paradigm Shift in Curriculum

Singularity in 2045 will bring the situation where almost a half of the jobs now will be replaced by intelligent robots. Oxford University predicts that 47% of the current jobs will disappear at the time of Singularity in 2045, which means that almost a half of freshmen today will lose their jobs when they are nearly fifty years of age. The Institute for the Future predicts and defines the future work skills that may be necessary in the future. The key concepts for the global education must be identified in order to design the mission as well as its associated curriculum.

It might be helpful to look at the key concepts proposed by the Institute for the Future, which focuses on the skills in workplace. The key concepts are: Sense Making, Social Intelligence, Novel Adaptive Thinking, Cross-Cultural Competencies, Computational Thinking, New Media Literacy, Transdisciplinarity, Design Mindset Visualized Communication), Cognitive Load Management, and Virtual Collaboration. It must be emphasized that none of the key concepts are currently incorporated in the education, still bound by the traditional and legacy curriculum. Thus, for the successful launch for the global education, such concepts must be incorporated in the curriculum.

The proposed curriculum must take such philosophical components as redefined stakeholders for education, andragogy, the realm of learning in the Bloom's Taxonomy Matrix, and the learner-centered Tesseractive© Education.

3. Research Method

3.1 Overview

This project will develop a robust curriculum for future generations to have the Tesseractive© Learning skills or competency to thrive and to show leadership in society. The ten crucial components for the future work skills defined by IFTF as well as the concepts of SDGs will be best incorporated in the curriculum being developed here. The research project consists of four sprints:

- Sprint I: Development for meta curriculum and Design for associated components.
- Sprint II: Design for Assessment Components
- Sprint III: Pilot tests and refinement of the entire system.
- Sprint IV: Dissemination: workshops for promotion of the research: Tesseractive© Curriculum

It should be emphasized that the research itself is an optimal showcase demonstrating problem/project-based learning with situational leadership in the social constructive model, which is best described as AGILE Learning Model.

3.2 Progress Report

So far, the training workshops or seminars have been conducted targeting at the same age group or the same skill level employees in series or sporadically at the university level or at the corporate level. The reason behind such trainings has been based on the concept that the outcome or results had been focused in order to sustain the status quo of the values that had been built while claiming the importance of the process of learning through trainings. For the system design and development, the progress has been published in the Kansai University's academic journal published in March 2019. In the article titled "A Proposal for ICT-Enhanced Learning Environment Fortified with BYOD Choreographies: Designing an Online Active Learning System to Foster the 21st Century Skills", the following system design was presented.

3.3 Case Study – Assessment of Learning Outcomes

The global collaboration between Kansai University (Japan) and Nanyang Polytechnic (Singapore) focused on assessing Tesseractive© Learning skills and competencies. It explored social entrepreneurship and UN SDGs with 7 teams of 74 participants over 8 weeks in 2019. Each international team comprised a Japanese and Singapore team. Teams use online collaboration tools (Skype, Flipgrid, Padlet, Google Apps) to produce SDG-targeted innovations that resulted in green services, eco-products and sustainability apps using business model canvases. The teams completed a pre- and post-test of entrepreneurial skills using FINCODA, which measured self-perceived innovation competence based on creativity, critical thinking, initiative, teamwork and networking. Content

analysis of pre and post teams' business model canvases (LEANSTACK) also coded for value proposition, value ideation, insights, foresight and readiness.

Despite language and cultural barriers, initial results are promising. Teams reported increases in innovation competence for creativity (8.7%), critical thinking (5.4%), initiative (4.1%), teamwork (2.3%) and networking (3.7%). Content analysis of business model canvases captured innovative competence increases for value proposition (10.6%), value ideation (10.9%), insights (23.3%), foresight (15.9%) and readiness (15.2%).

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References

Glazer, H. R., & Wanstreet, C. E. (2011). Connection to the academic community: Perceptions of students in online education. Quarterly Review of Distance Education, 12(1), 55-62.

Graham, C. R. (2006). Blended learning systems. Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.). The handbook of blended learning: Global perspectives, local designs, 3–21. Retrieved January 20, 2019, from https://books.google. com.mx/books?isbn=1118429575.

Horizon 2020. (2018) Funding, Tenders. Retrieved January 20, 2019, from https://ec.europa.eu/programmes/ horizon2020/en/what-horizon-2020.

Institute For The Future. (2011) FUTURE Work Skills 2020. Retrieved January 20, 2019, from http://www.iftf.org/uploads/ media/IFTF_FutureWorkSkillsSummary_01.gif

Kozma, R. B. (Ed.). (2003). Technology, innovation and educational change: A global perspective. Eugene: International Society for Technology in Education International Association for the Evaluation of Educational Achievement.

Lajoie, S. P., Hmelo-Silver, C. E., Wiseman, J. G., Chan, L. K., Lu, J., Khurana, C., et al. (2014). Using online digital tools and video to support international problem-based learning. Interdisciplinary Journal of Problem-Based Learning. https://doi.org/10.7771/1541-5015.1412.

Law, N., Pelgrum, W. J., & Plomp, T. (2008). Pedagogy and ICT use in schools around the world: Findings from the IEA SITES 2006 study (CERC Studies in Comparative Education). Hong Kong: Springer, Comparative Education Research Centre.

Peñalver, M. J. P., Mas, L. E. A., & Fleta, B. M. (2018). Identification and classification of behavioural indicators to assess innovation competence. *Journal of Industrial Engineering and Management*, *11*(1), 87-115.

VISION 2020. (2014) Vision 2020 – Education. Retrieved January 20, 2019, from http://www.planning commission.gov.in/reports/genrep/bkpap2020/14_bg2020.pdf.

Waddoups, G. & Howell, S. (2002). Bringing online learning to campus: The hybridization of teaching and learning at Brigham Young University. International Review of Research in Open and Distributed Learning, 2(2). Retrieved Month day, year, from http://www.irrodl.org/index.php/irrodl/article/view/52/108.

Yamamoto, T., Okunuki, M., & Watanabe, M. (2017). Academic Writing as Corpus for Assessment of ePortfolio. Session: Education Innovation with ICT. PNC 2017 Annual Conference and Joint Meetings at National at Cheng Kung University, Tainan, Taiwan.

Yamamoto, T., Wu, W. V., Liao, A. Y. H. , & Tagami, M. (2017). Proposing a New Phase of Liberal Arts Course Enhanced with Active Learning for PBL in the Social Constructivism Paradigm: Advanced Communication Based on Empathy & Trust Building. PNC 2017.

Yamamoto, T., Shih, M., and Watanabe, M. (2018). What is the Educators' Mission for the Future Students? - Scenario Planning of Educational Design Targeting at the Singularity Era. DLSA 2018. Hokkaido U.

Yamamoto, T., Liao, A. Y. H., Wu, W. V., Shih, M., Shih, J., Chu, H. (2018). A Proposal for the Global and Collaborative PBL Learning Environment Where All Global Members on Different Campuses Are 'On the Same Page' throughout the Process of Learning in the Project. 2018 Conference on Technologies and Applications of Artificial Intelligence (TAAI). Publisher: IEEE. (DOI: 10.1109/TAAI.2018.00029).