

## Applying PTCA model and Four-building Blocks as Measurement Framework in Assessing the Creativity of Liberal Arts Students in China

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### ABSTRACT

*A leading plan-do check-act (PDCA) is a four-step management model (Deming circle), used in business for continuous improvement of processes and products. However, Dr. Deming declared in his 4-Days with Deming in the UK in 1990, before he passed away that what he told the Japanese in the 1950's was really meant to be 'Try' instead of 'Do' (Ho, 2019). Unfortunately, Japanese did not have the word 'Try' at that time. Hence the mistake was made as 'Do'. Therefore, in effect, it should read "PTCA". This study will apply Four-building blocks approach and PTCA model as measurement model to conceptualize the outcome-based learning of creativity in classroom. Previous study in Paradigm shift of creativity explored the classical and family of creativity from 1950 to 2010. The nature of creativity are classified as three operational domain in cognitive, affective and psychomotor in educational theory. The new operational framework will be developed to explain the assessment of students' creativity in regular classroom across the major programme. The theoretical framework and psychometric property of assessing creativity in PDCA will be created. The literature of this study reveals the implication of multidimensional construct of creativity and provide insight of applying PTCA model for student-centered classroom. The continuous improvement of assessment students' creativity for career development will be reported.*

**Keywords:** PCDA, PTCA, Assessing Creativity, Constructs of creativity, Measurement Framework

### 1. Introduction

This is a conceptual paper to explore the conceptual and operational framework to measure the creativity of liberal students in a student centred-classroom in China. Creativity has been described as the most important human ability, which contributes to economic growth from as a significant sector and a meaningful contributor to national gross domestic product to support the creative economy of the 21st century (Creative Economy Outlook, 2018). Possessing creativity seems to be a distinctive process which adds value to the creative workforce who have been graduation at tertiary education. Over the past seven decades, the assessments of creativity of individual students in classroom were almost impossible to carry out in traditional tertiary education.

Following the historical movement of creativity research by searching the keywords "Creativity" and "Assessing Creativity", there is an increasing amount of research literature, investigating the nature of creativity and assessing creativity. Reviewing the published literature on creativity, there is a lack of instruments for an objective measurement or approach explained the impacts of measuring the creativity of liberal arts students in classroom especially in China. Therefore, there is a need for the educational purpose to develop the measurement framework for understanding the students' creativity in the context of an international liberal college in China. This study aims to design an integrated approach (PTCA model and Four-building Blocks approach) in measuring creativity and solve the existing difficulties of reliability and validity when measuring the learning outcomes of creativity in classroom.

The difficulties in measuring creativity in tertiary education have been discussed (Lau, 2010). Three researchers (Lau, Ng & Lee; 2009) and design educators from a leading design school in Asia noted that a systematic and deliberate design creativity training has not yet been implemented in any design education

programme in tertiary education in Hong Kong. Therefore, measuring creativity in tertiary education in a systematic way without bias seems to be a challenging goal.

Applying creativity in tertiary education is never structured like the outcome-based learning curriculum nowadays, prevalent in most of the government-funded institutes. Unfortunately, the learning outcome of creativity is a myth to most of the design educators or in higher education. The learning outcomes is little focus on creativity in assignments or in graduation requirements. The nature of creativity, an unobservable ability, has never been explored with systematic scoring rubrics in tertiary education. Learning to be a creative tertiary student seems an impossible goal in outcomes-based learning. This study will explore two systematic approaches, the PTCA method and Four-building Block approach (Wilson, 2005) to explore the conceptual framework in measuring an individual student in the classroom of liberal arts college.

### **Expectation**

The possible implication of the new measurement framework will enrich an in-depth understanding of measuring creativity through objective measurement supports a paradigm shift of changing the creativity education in liberal arts students in China.

## **2. What PTCA can do in classroom?**

The PTCA method is being used and reported for iterative development of an intervention. The original description by Deming (1986) was related to the manufacturing of products or process development cycle. Then, Langley (1996) adapted the PTCA for use in healthcare contexts. In 2004, Speroff and O'Connor further extended the PTCA method is analogous to scientific methodology.

### *Key Features of the Measurement Framework*

In order to create to the four new scales (creative cognitive knowledge, creative affective commitment and creative psychomotor) from creative outcomes in classroom, the research design of the present study adopted the Plan-Do-Check-Action model and the Four-building Blocks (PTCA-4Bs) approach to develop a new conceptual and operational framework for three new scales from creative cognitive knowledge, creative affective commitment and creative psychomotor. The psychometric properties of the scales development are supported by Classical Test Theory (CTT). The main goal for developing the PTCA-4Bs measurement framework is to transform contemporary concepts in educational measurement, definitions of creativity and educational theory through the traditional classroom practice into psychometric scales development in students-centred assessment scales. The developed scales transform the creative cognitive process dimension, creative affective commitment and creative psychomotor into validated classroom assessments.

## **3. Conclusion**

The new operational framework will be developed to explain the assessment of students' creativity in regular classroom across the major programme. The theoretical framework and psychometric property of assessing creativity in PTCA will be created. The literature of this study reveals the implication of multidimensional construct of creativity and provide insight of applying PTCA model for student-centered classroom. The conceptual framework and operational framework for continuous improvement of assessment students' creativity scales (Leung, 2017) for career development will be discuss under the Deming PTCA Cycle (Ho, 2019) and Four-building Blocks approach (Wilson, 2005). The students are expected to apply their creative cognitive knowledge, creative affective commitment and creative psychomotor into creative outcomes as students-centred creativity scales.

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### Authors' Backgrounds

	<p><b>Dr. Hoi Yung LEUNG</b> is an active psychometric researcher, art and design educator and design professional (graphics, multimedia, products and experience design). He is the chief examiner (2012-present) of HKDSE (Visual Art &amp; Design) for HKEAA and certified trainer as Adobe Certified Educator (2011). Dr. Leung was nominated as a Committee Member (Technical Advisor) of UNESCO Observatory for Research in Local Cultures and Creativity in Education (RLCCE) (2011), Subject Specialist (Creative Industry &amp; Publication and Printing, 2006-2012) in HKCAAVQ, Chairman of Hong Kong Design Community (2010-2012) and Founder of Hong Kong Design Directory. Dr. Leung is a psychometric researcher in creativity, his key research area is studying "The New construct of Measuring Creativity", effectiveness and scale development of measuring students' creativity, by objective measurement approach (Rasch Theory and Items Response Theory).</p>
	<p><b>Mr. Tat Keung TAM</b> studied art, theater and education in Hong Kong, London, and Durham, etc. He is a Hongkong-Shenzhen based multi-disciplinary artist, crossing the boundaries of exhibition, theatre, performance, installation and audio sound. His works were presented in the Hong Kong Biennale of Art, HongKong-Shenzhen Biennale of Architecture and Urbanism, Guangzhou Triennial, National Gallery of Art, Kuala Lumpur and National Museum of Hu Chi Minh City, Itpark, Whashang Art Village, MOST etc., He participates World Stage Design 2013, UNESCO Conference in Seoul, MAAP (Multimedia Art Asia Pacific) Conference, and OISTAT (Int. Organisation of Scenographers, Theatre Architects and Technicians) Conferences. He also actively joined the research projects from School of Design and Educational Development Centre, the Hong Kong Polytechnic University. His publication entitled “Delta Crisis: cultural analysis”, etc.</p>
	<p><b>Dr. Wing Lam CHAN</b> worked in various news organisations, including Radio Television Hong Kong, Travel QnA, and Island East Markets, etc. With her hard-earned experience, she accomplished her PhD study on communication at Hong Kong Baptist University in 2017. Apart from having taught in Mainland China and in Hong Kong, she has also experienced teaching and carried out research in London—when she took a visiting researcher role at the University College London in 2016 for an academic exchange. Her research outlets are on media writing, journalistic presentations and consumer behavior.</p>