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Nurturing Creative Thinkers with Competency-Based Training

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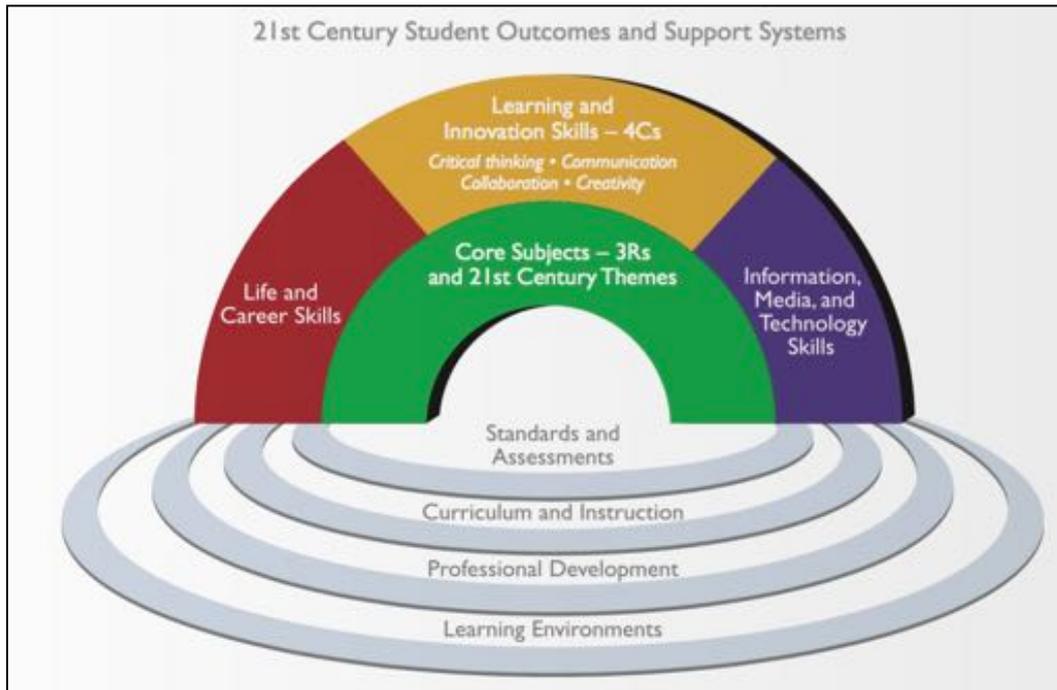
ABSTRACT

Creative Thinking is widely acknowledged as a key 21st century skill. However, not many educational institutions in Singapore have infused Creative Thinking as a module in their curriculum. The findings from a global research, “State of Create” (2012), sponsored by Adobe Systems highlighted a “Creativity Gap” between an individual’s creative thinking capability and creative thinking potential. This paper posits that everyone can be creative and proposes a Competency-Based Training System to help individuals boost their creative capability and to narrow the “Creativity Gap”. This paper will provide an overview of the Competency-Based Training by referring to the Singapore Workforce Skills Qualifications (WSQ) Framework, which has been adopted by the Workforce Development Agency. The core of the Competency-Based Training System is the PCAN Model© (a creative thinking methodology) and the 4 Creative Ideas-On-Demand© Techniques. Both are time-tested step-by-step thinking processes that enable specific competency units to be developed. This paper will share the Formative and Summative Assessment Schemes that are critical in any Competency-Based Training System. The Mixed Methods Research methodology is being used. This paper concludes that the adoption of the Competency-Based Training enables skills formation and helps to close the Creativity Gap.

Keywords: competency-based training, creative thinking training system, WDA WSQ competency framework, creativity gap

Problem Statement

Creativity is widely acknowledged to be a key 21st century skill, and it is included in many countries’ lists of desired college and career-ready outcomes for students. Creativity is included in the P21 Framework for 21st Century Learning as one of the Learning and Innovation Skills (P21, 2105, Framework for 21st Century Learning). Also known as the “4Cs,” they include creativity, critical thinking, collaboration, and communication.



Source: P21, 2105, Framework for 21st Century Learning, Massachusetts, Washington, DC 20001.

The well-documented, shifting global paradigm from manufacturing to knowledge-based to innovation economies makes the ability to solve problems creatively a necessary skill for educational and workforce success. In an age when much of the world's information can be quickly accessed on a smartphone, a premium is placed on the ability to use that knowledge in creative ways to produce valuable outcomes and solve complex problems. The ability to innovate, both alone and in groups, leads to positive outcomes in the workplace, the playing field, and the family room.

21st Century Competencies or 21 CC

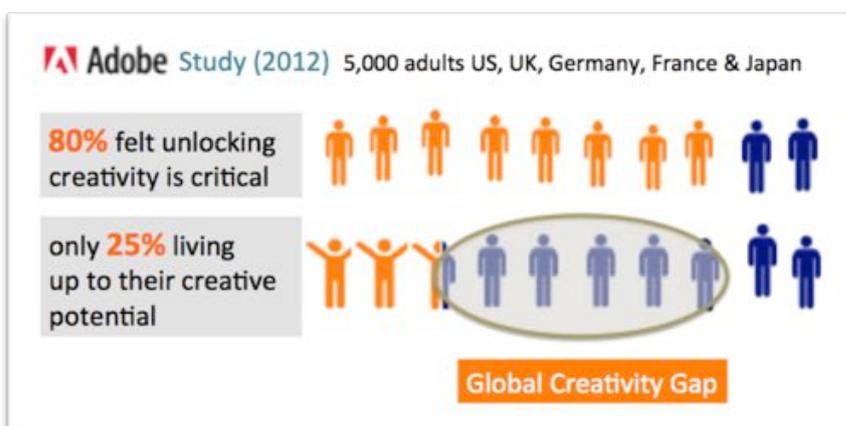
The Singapore Ministry of Education (MOE, 2104) recognises the critical need for developing student's 21st century skills and proficiencies as to build in them the capacity to succeed in a diverse, global, complex and media-saturated society. One of the 21st Century Competencies or 21 CC is Critical and Inventive Thinking, which encompasses Creative Thinking. However, not many educational institutions infused Creative Thinking as a module in the curriculum.



Source: <http://www.moe.gov.sg/education/21cc/>

The “Creativity Gap”

A global study by Adobe Systems (Adobe, 2012) reported 8 in 10 people felt that unlocking creativity was critical to economic growth and nearly two-thirds of respondents felt creativity was valuable to society. Yet a striking minority, only 1 in 4 respondents, believed they were living up to their own creative potential.



(Source: Richard Mak and Soo Wai Man, 2015)

This research highlighted the “Creativity Gap” between the importance of creativity and the dire need for more creative capacity in individuals.

The objective of this paper is to bridge the “Creativity Gap” by nurturing Creative Thinkers with Competency-Based Training approaches.

Literature Review

Defining Creative Problem Solving (CPS)

Creative Problem Solving (CPS) is a process that provides an organizing framework for creative and critical thinking techniques to help design and develop new and useful outcomes for meaningful and important challenges, concerns and opportunities (Isaksen, Dorval & Treffinger, 1994). CPS is an operational model for solving problems where creativity is applicable.

Over the past fifty years, many versions of CPS were developed through a common framework of practice and theory. It might be helpful to consider these different versions like the different updates of various software packages. This analogy may work because much like any particular software package, CPS had undergone some fundamental changes through continuous updating (Isaksen & Dorval, 1993a; Isaksen, Dorval, Noller, & Firestien, 1993; Treffinger, Isaksen & Dorval, 1994).

The first versions of CPS focused on making the creative process explicit and deliberate. Alex Osborn’s (1952, 1953, 1957) original description of CPS outlined the seven-step CPS model. Osborn (1963, 1967) provided a revised description that condensed the seven steps into three major stages of CPS.

The next major revision to the CPS model came during the preparation for an eclectic creativity instructional program. Parnes (1966) developed an instructors’ manual for institutes and programs outlining the Osborn-Parnes CPS five-stage CPS process. Parnes (1967a & b) provided one of the earliest graphic depictions of the CPS model illustrated as a spiral. Noller, Parnes & Biondi (1976) and Parnes, Noller & Biondi (1977) outlined the horizontally framed series of diamonds.

Treffinger, Isaksen & Firestien (1983) built upon the Osborn-Parnes approach to CPS by modifying the graphic of the model so that it was in a vertical position. In addition, they provided a greater emphasis on and explication with the converging phases in order to bring an improved balance to the instructional program as well as an increased clarity to the social roles of facilitator, client and resource group.

Singapore Workforce Skills Qualifications (WSQ) System

This paper provides an overview of the Competency-Based Training approach with reference to the Singapore Workforce Skills Qualifications (WSQ) Framework. The WSQ Framework was adopted by the Workforce Development Agency, a government body tasked to develop the human capital capacity of the workforce in Singapore.

Singapore implemented a National Qualifications Framework (NQF) in 2005, (SWDA 2010) – referred to as the - Singapore Workforce Skills Qualifications (WSQ) system. It drew upon competency-based training (CBT) models established in United Kingdom, Australia and New Zealand (Ramu Kodiappan, 2011).

Singapore Workforce Skills Qualifications (WSQ) is a national credentialing system that trains, develops, assesses and recognises adult workers for competencies they need to stay employable. Based on standards developed by the Singapore Workforce Development Agency (WDA) and various industries, WSQ ensures workers acquire skills needed by employers at the workplace. With clear progression pathways, workers can also use WSQ to

upgrade their skills and plan their careers.

As training and assessment are competency-based, not academic-based, workers must demonstrate the right competencies before they are certified. Experienced workers however, can receive WSQ certification without training. WSQ is accessible to all workers, as its entry criteria are skills and knowledge, not formal qualifications. The quality of WSQ is assured by WDA, from the development of competency standards, accreditation of training providers to the award of its qualifications.

WSQ Competency Standards

WSQ competency standards are reference documents that capture relevant information about a particular job task of a job role in an industry setting. A WSQ competency standard documents the expected work performance outcomes, the expected level of performance, the knowledge that supports the delivery of work performance outcomes and the work contexts under which the work performance outcomes are to be delivered, according to industry agreed minimum standards and expectations.

In other words, a competency standard states what an individual is able to do, what an individual should know, when and where an individual would perform his job role and how well an individual would perform in his job role.

Uses Of WSQ Competency Standards

WSQ competency standards are designed to serve multiple users in the context of Singapore workforce education and development. The intended users of the competency standards include individuals, employees, employers, training providers, government agencies and awarding bodies. The benefits and uses of WSQ competency standards for various users are highlighted below.

| User Group | Benefits and Uses of WSQ Competency Standards |
|-------------------------|--|
| Employee / Individual | For self-evaluation so as to ascertain if he / she is ready for a particular job and for identification of own development needs. Receive subsidised quality training and development. Obtain nationally recognised credentials. |
| Employer / Organisation | For recruitment, selection, development, performance management and talent management. An employer can use competency standards to decide and design tools that will place, develop and promote staff for maximum performance to achieve business needs. Assured of quality training of staff by providers. |
| Training provider | For development and implementation of CET interventions. To design training and assessment programmes that best develop trainees' abilities according to skills sets stated in competency standards and to help trainees progress according to different levels of competency. Receive national endorsement in training delivery and assessment. |
| Authority / Government | For management and planning of industry manpower requirements. To determine skills level of key occupational groups with the aims of improving the quality and productivity of particular industry. Some agencies use the competency standards to facilitate the legislation and licensing of skilled occupations. Examples include NEA, SIRD, STB, MOM. |
| Awarding body | For awarding of qualifications and certifications. WDA is the awarding body of WSQ, utilises the competency standards to design, quality assure and award qualifications and certifications. |

Source: (SWDA 2006)

Difference Between Competency Unit And Competency Standard

The terms ‘Competency Unit’ and ‘Competency Standard’ are often used interchangeably because competency standards are usually developed on a competency unit basis.



(Source: Richard Mak and Soo Wai Man, 2015)

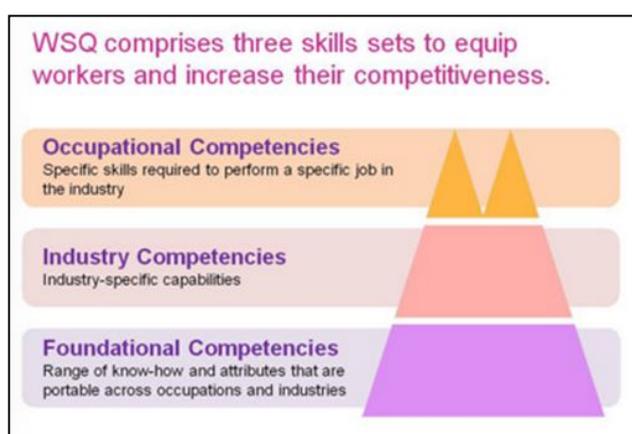
When presented in a competency map, WSQ competency units help us understand how work items and jobs are organised within industries. WSQ competency standards help us understand how well an employee must be able to perform at his job. WSQ competency standards:

- Define expected work performance outcomes
- Define acceptable level of performance required of an employee to perform effectively in his workplace
- Provide behavioural-based descriptors of performance,
- Indicate knowledge a competent employee must have
- Illustrate types of evidence an employee must show to prove competence
- Describe conditions and context under which the employee should demonstrate the expected level of job performance
- Are endorsed by employers and validated by industry in meeting minimum standards in job performance

Creative Thinking is a “Foundational Competencies”

Creative Thinking skill is Foundational and cross-industry skills comprise a range of skills, knowledge and attributes that help every individual improve his/her employability.

These skills enable workers to better adapt to new job demands and a changing work environment. Foundational skills are portable across all industries.



Source: <http://www.wda.gov.sg/content/wdawebbsite/L207-AboutWSQ.html>

Project-Based Learning (PBL)

Project based learning is based on a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around

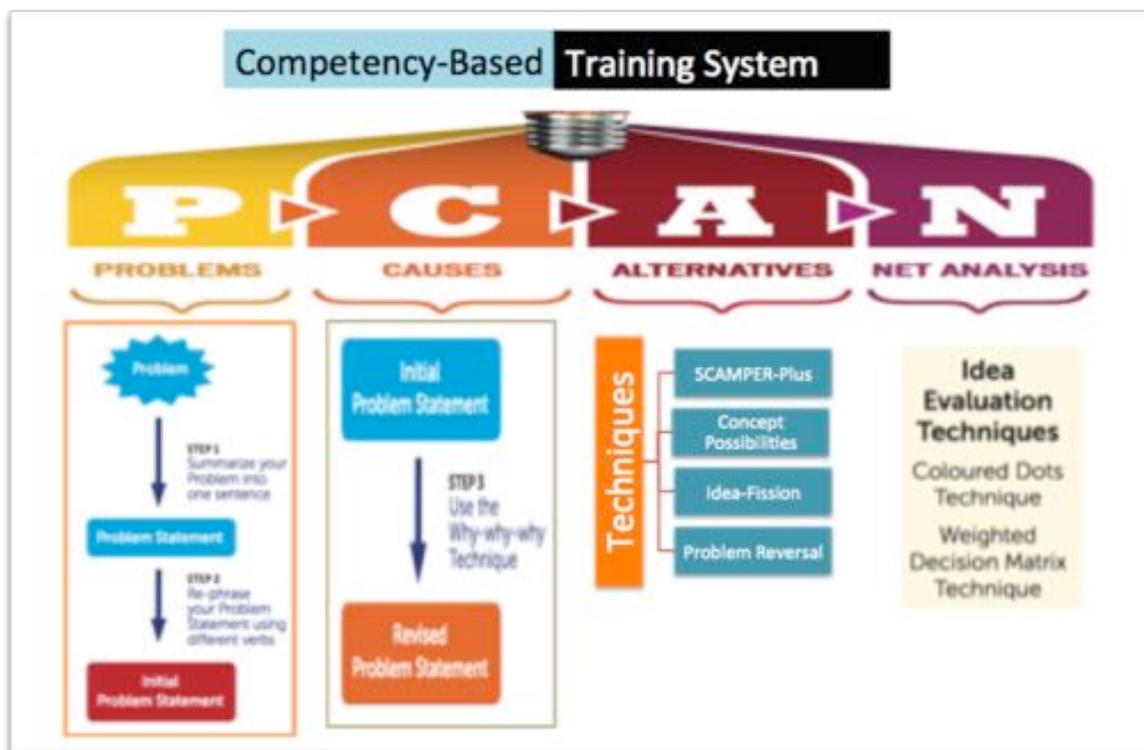
complex, authentic questions and carefully designed products and tasks (Buck Institute for Education). A research paper on “Project based learning: effects on knowledge and skills acquisition” indicated that PBL:

- (a) has a positive effect on student content knowledge and the development of skills such as collaboration, critical thinking, and problem solving;
- (b) benefits students by increasing their motivation and engagement (Brush, T., & Saye, J. 2008).

The PCAN Model[®] and the 4 CreativeIdeas-On-Demand[®] Techniques

To enable the adoption of the Competency-Based Training Approach, Richard Mak has developed the PCAN[®] Model and the 4 CreativeIdeas-On-Demand[®] Techniques. The PCAN[®] Model is a step-by-step Creative Problem Solving (CPS) methodology. This model is adapted from the Ctrative Pproblem Solving Framework. (Parnes, S. J. 1966).

The PCAN[®] Model helps to break down problems to bite-sized so that they can be tackled more effectively. It is an acronym for: Problem, Causes, Alternatives and Net



Analysis.

(Source: Richard Mak and Soo Wai Man, 2015)

In the 3rd stage of the *PCAN Model*[©], there are 4 *CreativeIdeas-On-Demand Techniques*[©]: 1) SCAMPER-Plus[©] Technique, 2) Concept Possibilities Expansion[©] Technique, 3) Idea-Fission[©] Technique, 4) Problem Reversal[©] Technique



(Source: Richard Mak, 2015)

How does the Competency Based Framework work together with the PCAN Model[©] and the 4 CreativeIdeas-On-Demand[©] Techniques?

Both the PCAN Model[©] and the 4 CreativeIdeas-On-Demand[©] Techniques involve step-by-step thinking processes.

1. There are 4 stages in the PCAN Model. Within each stage, there are many thinking processes
2. There are 3 thinking processes within each of the 4 CreativeIdeas-On-Demand[©] Techniques

Each of the thinking process lends itself readily to be developed into one Competency Unit and Competency Standard.

Findings of Study

This paper discusses findings with the use of the Mixed methods research which consists of surveys and personal interviews.

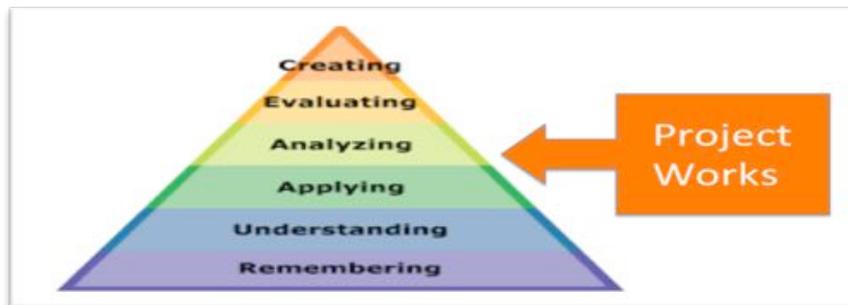
The following are reflections of Richard Mak's experience as an Adjunct Lecturer with the Singapore Management University for more than 5 years. He has taught about 430 undergraduates. Richard conducts a survey at the 1st lecture of his Creative Thinking module. This survey required students to rate their Creative thinking Capability on a scale of 1 to 5.

Rate Your Creative Thinking Capability On A Scale Of 1 to 5:

| | | |
|---|----------|-----------|
| I am not creative at all. | Rating 1 | ★ ★ ★ ★ ★ |
| I have to struggle to be creative. | Rating 2 | ★ ★ ★ ★ ★ |
| I am creative in some areas but not in other areas. | Rating 3 | ★ ★ ★ ★ ★ |
| I am a creative person and I enjoy it! | Rating 4 | ★ ★ ★ ★ ★ |
| I am definitely creative! Being creative is a big part of my life! | Rating 5 | ★ ★ ★ ★ ★ |

(Source: Richard Mak and Soo Wai Man, 2015)

Guess what is the percentage of 430 students rated themselves as "Not SO creative" i.e. a rating of "1 to 3". It is about 65%. This high percentage came as a surprise as it is higher than our expectation given that these students would have done many school projects that nurture their creativity. Through personal interviews and student project reports, we learnt that most of their projects they have done required them to "Analyze" and "Apply" what they were taught.



(Source: <http://www.learnnc.org/lp/pages/4719>)

However, when you look at Bloom's Revised Taxonomy, "Creating" is at a higher "Order of Thinking" than "Analyzing" and "Applying". Krathwohl, D. R. (2002).

The Project Work that the students have done may not foster their creativity as most of them require the "Applying" level of the Bloom's Revised Taxonomy and not the "Creating" level which is at a higher order of thinking.

Richard also reviewed the Creative Thinking module he delivers in the Singapore Management University. The contact time in this module is 21 hours:

- 70% of contact hours in content delivery,
- 30% of contact hours in assisting student with the Project Work

Recommendations

This paper posits that everyone can be creative. It proposes a Competency-Based Framework approach to make creative thinking processes accessible to the masses, from primary school through tertiary institutions and adult Continuing Education and Training (CET). The objective of our proposed solution is to help individuals boost their creative potential and close the "Creativity Gap".

Proposed Competency-Based Training System for Creative Thinking

There are 8 sessions in is proposed training system.

| S/no | Proposed Training System |
|------|---|
| 1 | <p>Sun Tzu, an ancient Chinese Military Strategist said, “Know your opponent and know yourself. Fight a hundred battles and win a hundred victories.”</p> <p>This session will enable you to know yourself and how you stand with regards to creativity, namely:</p> <ul style="list-style-type: none"> • Do I understand what is creativity? • Do I have the right attitude to be creative? • How creative am I now? |
| 2 | <p>By and large, the schools that we attend tend to nurture us to think analytically and logically.</p> <p>Sir Ken Robinson, in fact goes as far to say that schools in fact kill our creativity. This session describes the different types of Creativity Killers and teaches us how to deal with them.</p> |
| 3 | <p>We must not just deal with our Creativity Killers, we must also fortify ourselves. This session will teach you various ways to boost your Creative Thinking capability.</p> |
| 4 | <p>Creative Thinking cannot be taught in a vacuum. Our Book is written in the context of Creative Problem Solving.</p> <p>The problems we are given in school are pre-defined where the boundaries are clear and precise. But in real life, the problems are complex. The scope of the problems can be unclear and imprecise. The <i>PCAN Model</i>[®] is a step-by-step approach in creative problem solving. It breaks problems down into bite sizes so that we can better understand and solve them.</p> |
| 5 | <p>We are trained to think analytically and logically in school. Why don't we harness this thinking to prompt us think creatively?</p> <p>The SCAMPER Technique uses a “Checklist Approach”. As we go through the 7 components of SCAMPER, we will be prompted to think of many alternatives that we may not have thought of before. In this session, you will learn the <i>SCAMPER-Plus Technique</i>[®]. It is a more powerful technique than SCAMPER.</p> |
| 6 | <p>In this session, you will learn the <i>Concept Possibilities Expansion Technique</i>[®]. In a brainstorming, we are encouraged to suggest any idea whether it makes sense or not. More often than not, it is the illogical or crazy idea that will lead to the innovative solution. However, at the final stage of the brainstorming, when we evaluate the ideas, we tend to adopt only the implementable and pragmatic ones. The “crazy and illogical” ideas are usually discarded.</p> <p>There is a missing link between the “crazy and illogical ideas” and the</p> |

| | |
|---|--|
| | “innovative yet pragmatic solutions”. We found the missing link. This link is in Conceptualization where we extract the concept from each crazy idea and follow through to derive the innovative yet practical solution. You will learn how to conceptualize which is fundamental to Creative Thinking. |
| 7 | In a brainstorming session, we hope to harness the creative brainpower of the group. But, creative thinkers may withhold ideas they perceive to be crazy due to the Groupthink phenomenon. The <i>Idea Fission Technique</i> [®] is designed to smash through Groupthink. |
| 8 | The starting point in Creative Thinking is to look at our problems from a different perspective. The <i>Problem Reversal Technique</i> [®] teaches us to view our problems in unconventional ways. The more we reverse the problem statement, the more innovative the generated solutions would be. When you use this Technique, you will be able to produce creative ideas at the snap of your fingers. |

One of the key components of the Competency-Based Training System is the Assessment Scheme.

- Formative Assessment is carried out through Quizzes with Suggested solutions,
- Summative Assessment takes the form of Project works. Documentary evidence with Project Report & Presentation. “\$5 Challenge”, Creative Personality Interview, How to tackle a Real-Life Challenge, Etc.

Implementation of the Competency-Based Training System to nurture Creative Thinkers

Based on the research findings of this paper, in January 2015, Richard revised the allocation of contact time in his Creative Thinking module. Time allocated for Project Work is increased from 30% to 70% as follows:

- 30% of contact hours in content delivery.
- 70% of contact hours in assisting student with the Project works

In previous semesters, students learn about Creative Thinking mainly from lectures that ate into contact time. To save on contact time in content delivery, Richard made available sections of a book he has written, “*Creative Thinking On Demand, Learn To Solve Problems Creatively in 7 Hours*”. (Richard Mak, 2015).

Contact time is spent more productively in dialogue to clarify concepts and conducting Formative Assessment instead of lecture.

There are no examinations. Summative Assessment is based on Project Work. The Project Work requires students to “Create” products/services or solutions rather than to demonstrate how to “apply” the knowledge they learnt in class.

Conclusion

This paper concludes that:

- a) Nurturing creative thinkers can be done more effectively through Project Work that requires “Creating” which is the highest order of thinking in the Revised Bloom’s Taxonomy
- b) The development of the step-by-step PCAN[®] Model and the 4 CreativeIdeas-On-Demand[®] Techniques allows the adoption of the Competency-Based Training Approach that will help to close the “Creativity Gap”.

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