Forces of Academic Innovation

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ABSTRACT

Innovation in teaching and learning desires more than just creativity and a handful of empathy. It cries for inter-chained forces to ensure noble justice proliferate to the grass roots as the heart and soul to an academic innovation are the future leaders. Its notification and executions need to be right at first attempt. This paper tries to discuss the key concepts to academic innovation, value and executions by means of secondary sources reviews and in the end an academic innovation model is suggested. Lastly, words of advice from pioneering innovators summarize the discussion.

Keywords: *academic innovation*

Introduction

The 20th century popularized the word *innovation* and with it are words like *globalization, trans-culture, inter-discipline; paradigm shift, transcendent learning* and *knowledge managing.* These words awed the world. Ahuja and Lampert (as cited in Auerhammer, Neumann, Leslie & Lettice (n.d.)) and Tidd, Bessant and Pavitt defined innovation as "the commercializing of the invention." Even though inventions have been around since the cave men created their first tool, ranging from Plato's philosophy to Da Vinci's warfare technology, they were not commercialized in the true essence of modern time innovations. Thomas Edison, on the other hand, invented and commercialized light bulbs. Hence, innovation has redefined 'new and original' and got us on that production rat-race.

Innovation is termed as "the entrepreneurs' tool" (Drucker, as cited in McAdam, McConvery & Armstrong (2004)) and the success and survival kit for companies (Auerhammer et al., n.d). It has developed a new competitive world where industries squeeze think-tanks to produce innovative ideas. In words of Hattori and Wycoff (2002, p.25) "the challenge now is to live and thrive in the new world, where the call is for MORE innovation."

Thus we strive to innovate and Cowan (2006, p.147) warned "the risk of rediscovering the wheel" in our attempt to surrender to demands for more innovations. Some may merely be an enhancement, upgrades or extensions. So, databases of innovation are made available to certify new initiatives. For example, *Derwent Innovations Index* (www.thomsonreuters.com) which includes patent coverage/citation for over 14.3 million basic inventions from 40 worldwide patent-issuing authorities from the year 1963 can act as a checking tool of what has already been innovated. Another is *Thomson Innovation* SM (www.thomsoninnovation.com), which is a fully integrated searchable database of patent records combined with *Derwent World Patent Index (DWPI).* It has all the combined business and news information with comprehensive patent data and scientific literature.

Models of Innovation

There are several innovation models especially in the non-educational based industries. McAdam et al. (2004) compared some the models put forth by Hargadon and Sutton (as cited in McAdam et al., 2004) and Majaro (1988), where both described innovation "as a process of "knowledge-brokering cycle" which consists of four interlinked work practices: capturing

good ideas, keeping ideas alive, imagining new uses or old ideas, and putting promising concepts to the test." Buggie (2001) presented a similar "four phases of innovation" model where "the process – which will successfully attain innovation and hence future organizational growth – consists of four stages: strategy development, ideation, evaluation and implementation." Evangelista, Sandven, Sirilli and Smith(as cited in McAdam et al., 2004), however dismissed the production of innovation as a linear process because it disallows feedback and puts too much emphasis on research and development.

Hatori and Wycoff's (2002) "Model of InnovationDNA" (Figure 1 below) suggested a conceptual model which seems holistic as it includes people's beliefs, values and attitudes, its relationships to leadership's vision, strategy and structure not to forget the third party of suppliers, community and competitors.

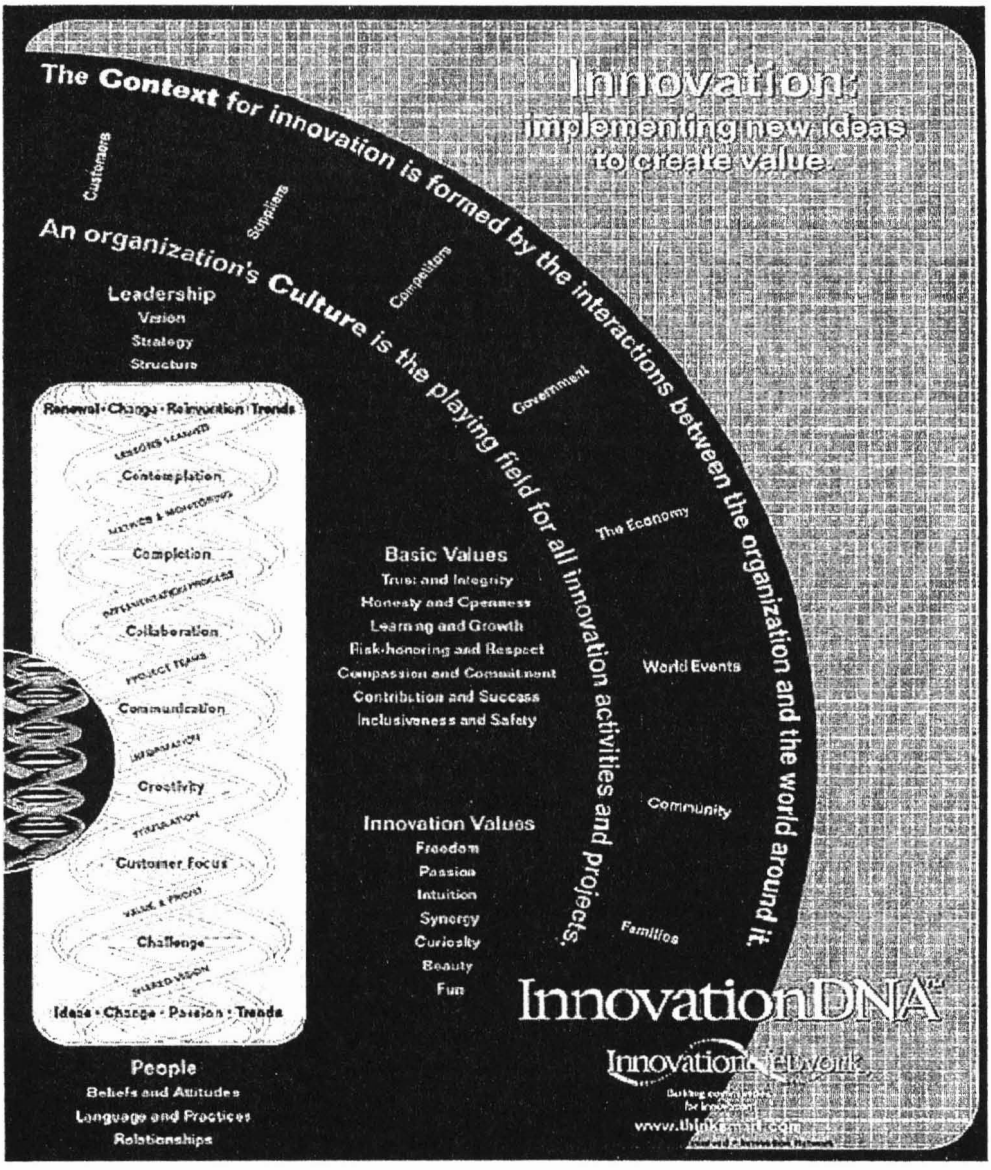

Figure 1: Model of InnovationDNA (Hatori & Wycoff, 2002)

According to Quinn (2000, p.13), "true innovation is complex and tumultuous - full of spurts, frustrations and sudden insights." Therefore theories and practicalities need to go hand in hand and undergo vigorous effectiveness research and series of quality assurance especially for an academic innovation as its impact may alter the future generations significantly.

Forces of Academic Innovation

The elements presented below may generate value-added academic innovations where such drive to produce do not cocoon academics into two hypotheses formulated in early 20th century by Rich (1992): (1) "if greater incentives and rewards are given to teachers, improved teaching will result and will lead to greater students achievement; and (2) a merit pay plan is likely the best way to bring about changes" (p.293).

Today, there is an abundance of research grants available. Locally, there are the government's allocations for fundamental, e-science, MOSTI and even industrial grants on the market and internationally, Toray Industries (under Malaysian Toray Science Foundation), Commonwealth and UNESCO research grants, to name a few. Merit comes graciously to performing academicians of all areas may it be general, teaching and learning based and especially to researchers, fellows and scientists. As monetary encouragement and incentives are allocated, academicians can engage themselves in the challenge and strive for excellence.

Research

Educational research shall enable the conception of the needs and demands of present and future students and educators as it involves active thinking, information gathering through literature reviews and findings synthesizing. Though Evangelista et al. (as cited in McAdam et al., 2004) stated that a simplistic model shall fail due to too much focus on the research and development aspect. An academic innovation model has to work from research findings that highlight weak or dysfunctional curriculum, policies or techniques. The journey of conducting research shall spur ongoing innovations.

Knowledge Management

Klomp and Van Leeuwen (as cited in McAdam et al., 2004) have argued that "interest in the innovation process has shifted away from the input (research and development) to the output stage (realised innovations)". This is where knowledge management takes charge. Knowledge from pioneering researchers and innovators – their experiences, flaws and re-emerging strategies from failures are all gathered to serve as an innovation kickstart. As much as research is still relevant, knowledge management will furnish shortcuts to innovators. The databases mentioned earlier can provide great examples of knowledge management.

Knowledge management has assisted many areas, for example, medicine and society development to name a few. Auerhammer et al (n.d.) wrote "the effective and efficient generation and use of knowledge as well as the transfer of knowledge into successful innovation is seen as the competitive advantage of organization today" (p.53)

Problem solving

When there is a problem, there should be a solution. When there are challenges, we overcome them. Just when snail mail annoyed us, we invented electronic mail. Thus our humanistic ability involving thought processes of analyzing a situation and putting puzzles together has always opened the door for solution seeking. Problems are also what initiated research. We see problems and try to understand them through a series of literature reviews, testing new

theories and understanding their impacts. These are performed through research efforts, thus in the end, solving a problem.

Huitt (1992) indicated the dimensions needed for problem solving and its outputs. Table 1 below shows different dimensions produce different strengths. The personalities below are also essential for problem solving innovations. The right personality would produce astonishing results suitable to produce innovations.

Table 1: Aspects of personality important for problem solving and decision making (Huitt, 1992)

Dimension	**Orientation**	**Criteria for Judging Effectiveness**	**Techniques**	**Strengths**
Extrovert	Outside world of people and things	Can "talk through" problem in group Works in "real world"	Brainstorming Thinking aloud Outcome psychodrama	Attend to external reality Listen to others
Introvert	Inner world of ideas	Internal logic, value of ideas Want to reflect on problem	Brainstorming privately Incubation	Attend to internal consistency of solutions
Sensing	Facts and details from past and present	Personal experience Practicality of solutions Conforms to standards	Share personal values, ideas facts, Overload Inductive reasoning Random word technique	Attend to details What could go wrong Develop and implement specific steps of solution
Intuitive	Concepts and principles Possibilities for future	Meaningfulness of facts, details Solutions consider total situation Prospect for originality	Classify, categorize, Deductive reasoning Challenge assumptions Imaging/ visualization Synthesizing	See connections and links Develop complex solutions Implications of improper solution(s) Develop major phases
Thinking	Objectivity Logic and reason	Solutions make sense based on facts, models, and/or principles	Classify, categorize Analysis Network analysis Task analysis	Attend to internal and external consistencies Evaluate for efficiency and effectiveness

Feeling	Subjectivity Values and affect	Solutions consider impact on people	Share personal values Listen to others' values Values clarification	Evaluate for impact on people Evaluate in terms of valued by participants
Judging	Organization Structure and closure	Decisions are made Solution can be Implemented A step-by-step procedure to follow	Evaluation PMI technique Backward planning Select single solution	Identify possible defects Follow steps during Implementation Evaluate for effectiveness and efficiency
Perceiving	Data gathering Processing solutions	Solutions are flexible and adaptable Enough information provided in solution Variety of alternatives considered	Brainstorming Random word technique Outrageous provocation Taking another's perspective	Develop complex solutions Flexibility

In any given situation, thinking is essential divergently or convergently. The core forces of academic innovation suggested earlier must therefore collaborate with thinking. There are three thinking methods that claim necessity in innovation production: constructive thinking enables us to set a workable emotion and attitude; critical thinking allows us to formulate methods and analyze them leading to solutions; and creative thinking encourages creative ideas to solve problems.

Constructive Thinking

To innovate, not only do we have to be optimistic but also realistic. Remove negative attitudes and publish our ideas. Yet our ideas have to be realistic and practical prior to execution. Constructive thinking encourages our emotions to react based on opinions that are thoroughly thought out. When research is highly demanded, whether we feel pressured or cherish the challenge depends on how our constructive thinking guides our emotions and actions. How we react to criticism, rejections and how we rebuild ourselves from failure to go on innovating rely on our constructive thinking. Constructive thinking supplies us with the much craved self-confidence to innovate.

Epstein (1998) believes that constructive thinking is the key to emotional intelligence and sets out several characteristics of a constructive thinker: Among them are: (1) happenings or challenges are seen in a much more positive light ;(2) focuses on success; (3) brushes failures or criticism on positive note; (4) sets on encouraging, good, productive thoughts; (5) promotes action based on thoughts rather than procrastination; (6) and dwells on current, relevant events.

Critical Thinking

As shown in Figure 2, Huitt (1998) proposed a model of critical thinking to illustrate demands in educational critical thinking. This model illustrates the need for stimulus, the right attitude to think and to deliver the thoughts along with much verification and clarification on the magnitude of the thoughts.

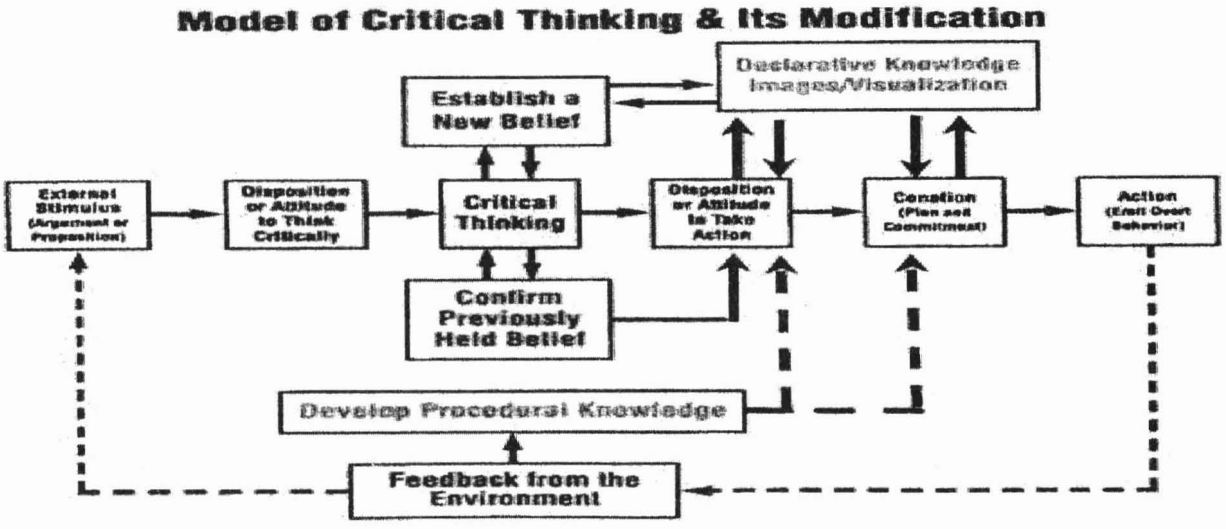

Figure 2: Model of critical thinking & its modification (Huitt, 1998)

Critical thinking as a process to innovation has been seen as an essential element. This mental process goes beyond the boundaries of solving a problem but synthesizing solutions to form a fundamental guidance.

Creative Thinking

Creative thinkers are often linked to the artistic faculty namely performing arts. However, creative ideas can also come from anyone. Treffinger, Isaken, and Stead-Dorval (2005) defined *creative* and *critical thinking* as summarized in Table 2 below.

Table 2: Creative and critical thinking (Treffinger, Isaken & Stead-Dorval,2005, p.3)

Thinking	What is involved?	Why?	How?
Creative thinking	encountering gaps opportunities paradoxes challenges concerns	search for new meaningful connection	by generating -many possibilities -varied possibilities -unusual & original possibilities -detailed, expand, enrich possibilities
Critical thinking	examining possibilities carefully, fairly and constructively	focusing thoughts and actions	-by organizing & analyzing possibilities -refining & developing possibilities -ranking & prioritizing options -choosing & deciding on certain options

Creativity can sometimes be defined as innovation but not all that are creative are new. Nevertheless, one believes that we should not think too hard or worry too much to produce innovation as knowledge from the past has proved that some of the most innovative ideas were thought while relaxing under a tree, taking a bath in a tub and yelling for an assistant.

Model of Academic Innovation

The forces mentioned in the previous paragraphs may be summarized into a holistic empathetic approach, a non-sequential process model which allows back-flows – feedbacks and interaction (Evangelista et al. as cited in McAdam et al., 2004) - to best suit attempts to generate academic innovation especially for young innovators.

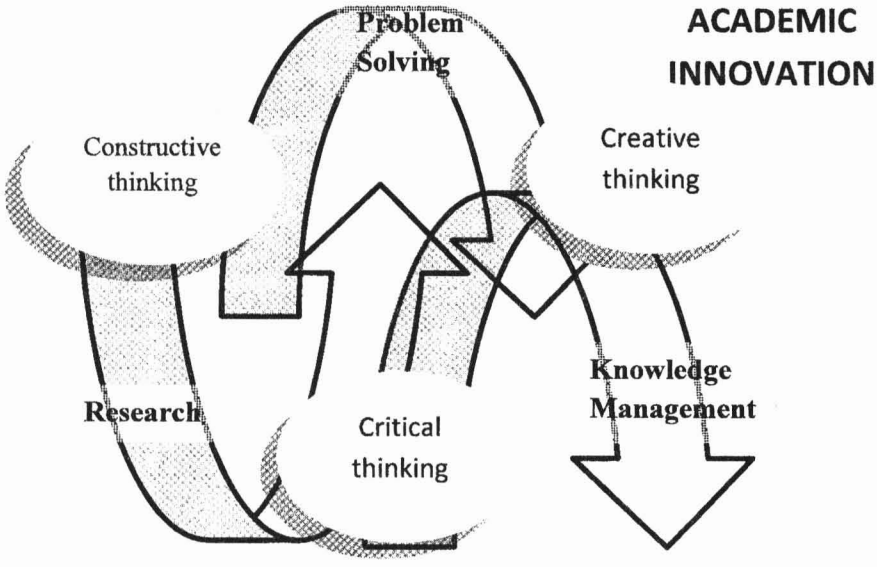

Figure 3: Model of Academic Innovation

The model in Figure 3 above illustrates what is essential in an academic innovation. Interconnectivity among all forces is vital. They should be allowed to overlap each other and mistakes are corrected by going back and forth between these elements. As there would be unforeseen effects on students' in piloting, identification of mistakes before execution is crucial. Implementing baseless impulsive ideas shall merely mask trouble. Empathy towards students and implementers is pivotal here.

This model is created with Klomp and Van Leeuwen's recommendation in mind as they stated "... moreover the focus is now also on the linkages between the three stages of the innovation process, input, throughput and output, with the role of innovation as a driving factor of long term macro-economic growth taken for granted" (as cited in McAdam et al., 2004).

The ideas gathered in problem-solution and research attempts may spur innovative solutions. Then, knowledge management shall permit comparing and contrasting past and present ideas to suit future ones. Rotating wheels of constructive, critical and creative thinking shall prompt sparkling academic innovations. Each plays a part in research initiation, problem solving efforts and knowledge gathering and managing. Constructive thinking shall first encourage us to see demands on conducting research, solve problems or seek knowledge for more innovation as a challenge to excel. We would tolerate obstacles professionally and fulfill the demand. Critical thinking pushes us to formulate ideas and seek solutions. Then creative thinking would assist us in generating artful ways to rationalize ideas.

Value and Execution

Innovation sparkles industries and turns followers into leaders. Although all that sparkle may not be gold, innovation is the key to advancement.

Academic innovation needs to have value to students, educators, supporting staff and the surrounding community. Value for the industries may be labeled by its marketability, profit boost or strength to the organization. Yet value for the education industry may be not just the marketability of our graduates but their future social performance and workplace achievements. How our graduates think and act even ten years after graduation would still reflect on what educational background they have received. Tan Sri Dato' Seri Musa Muhamad, the Minister of Education (2002:2), mentioned that the core business of education is "to prepare people-youths to run and manage all types of organization." Thus, educators have enormous responsibility when they think of an innovation.

The life-shelf of an innovation may be obsolete the next day it is showcased. Execution needs to be made as soon as details are finalized and all foreseeable mistakes are corrected. Unfortunately in the educational industry the impact of unsympathetic innovation can be cathathr osh bunner2. Ruthless execution and implementation of an academic innovation may alter a generation's thoughts, work ethics and lifestyle. Should there be active experimenting or pilot testing? Implementation of novel teaching techniques, curriculum and policies must launch immediate betterment, not experiential or piloting revenues and there should be no call-backs. Value added essences are craved as there might not be any soft landing cushions. Cowan (2006) stressed, "Don't make a start unless you have reason to be fairly confident that your intended innovations can be successful for you, and for your students"(p.146).

Conclusion

As pessimistic as it may sound, Cowan, in answer to Smyth's (as cited in Cowan, 2006) suggestions, urges the future innovators to anticipate and be prepared for failure, criticism and cynicism; attend trainings; identify assistance; manage time and make a case to wider benefit faculty/community. He emphasized these based on his experience that innovators should "avoid failures, pilot the innovative ideas without damaging students' attended progress and retain confidence upon judgment"(p.155).

Lastly, innovation can be beneficial as well as hazardous. As academicians and educators, we should take the call for more innovations as a pure effort to accelerate the advancements and achievements which are vital to such borderless world of education, but we too should be wary of any impulsive executions.

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