A CASE STUDY ON CREATIVITY, INNOVATION AND ENTREPRENEURSHIP EDUCATION OF THE UNIVERSITY IN TAIWAN

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Abstract:
A creative economy is the latest developmental stage in global economic restructuring. Numerous countries and enterprises have emphasized competitive advantage by "creativity" and "innovation." Innovation competition in education has recently become a popular method to elevate student creativity. Education policy-makers have emphasized the urgent need to develop “human resources,” particularly to promote creativity, adaptability, and enhanced communication. Most scholars investigating creativity and education have focused on the relationship between teaching and creativity or individual student creativity. The creativity domain is a promotional, inhibition-supportive creative environment system.

This study focuses on a creative campus environment and entrepreneurship education. We use case study and introduce the program “Application Program of Academic Innovation and Creativity” of National Pingtung Institute of Commerce (NPIC), a public business college in Taiwan. The results show a non-significant statistical increase in the application level of Information and Communication Technology (ICT) creative works in the previous 3 years. A stronger foundation for ongoing creativity research and consolidating the theoretical knowledge base is important for strengthening ICT application, local features, and educational practice of collegiate creative education.

Keywords: Creative Education, Entrepreneurship Education, Case Study, Expert Assessment

1. INTRODUCTION

In the global economy, a country or an enterprise must face structural disintegration of the new economic system to ensure competitive advantage by "creativity" and "innovation." The new economy as a creative economy is the latest development stage in global economic restructuring. The developed world has transitioned from an agricultural economy to an industrial economy and from a post-industrial/mass production economy to a knowledge economy. Upheavals in technological innovations and the global-competitive need for the creative class to develop new product and process innovations have marked the latest stage.

In the creative economy era, "brain" and "creative" intensive industries have gradually replaced "land" and "labor" intensive industries. Numerous countries have made creative talent a measure of national competitiveness. The importance of creativity in education and training is also increasing. The development of creative capabilities in education crosses all disciplines, such as flexibility and communication skills, imagination, and cross-cultural understanding (Yang & Hsu, 2007).

Innovation competition has recently become a popular international technical application method in creative and entrepreneurship education that uses competition to facilitate science and technology comprehension. Numerous schools have also established creation, innovation, and enterprise as foundational to the related curriculum to cultivate students according to future societal challenges. However, service industry promotion is driven by technical change to enhance working efficiency and service quality.

This study focuses on a creative campus environment and entrepreneurship education. We will introduce a program of National Pingtung Institute of Commerce (NPIC), a public business college in Taiwan. This program “Application Program of Academic Innovation and Creativity” was in line with the Taiwan’s government policy and industry trends, emerging service industries by applied information and communication technology through innovation and entrepreneurial activity.

2. LITERATURE REVIEW

2.1. Creative Education

Education worldwide faces unprecedented economic, technological, social, and personal challenges. Policy-makers have emphasized the urgent need to develop “human resources,” particularly to promote creativity, adaptability, and enhanced communication (NACCCE, 1999). The creative economy has two dimensions: information technology and creativity. In an information society, people must be able to use modern technology and equipment. Thus, education must cultivate high-quality people who quickly and effectively adapt to changing talent.

In Asia, education in Singapore emphasizes creativity and innovation, and promotes several important policies such as "Thinking Schools," "Learning Nation," and “The Masterplan for Information Technology in Education." These policies that enhance national economic competitiveness are a successful example under the global economy (Tan & Gopinathan, 2000).

The Taiwanese Ministry of Education announced the “White Paper on Creative Education” in 2002. The vision was to establish a “Republic of Creativity (R.O.C.) for Taiwan.” The six initial programs to promote education creativity included nurturing trips for creative learners, professional development for creative teachers, comprehensive management for creative schools, creative life in action, online learning through a creative intelligence bank, and ongoing consolidation of creativity cultivation.

2.2. Entrepreneurship Education

Entrepreneurship is about people, their choices and actions in starting, taking over or running a business, or their involvement in a firm’s strategic decision-making. Entrepreneurs are a heterogeneous group and come from all walks of life (Commission of the European Communities, 2003).

In all economic sectors, the entrepreneurial process is a fundamental source of innovation through which individuals, teams and organizations create wealth by bringing together unique packages of

resources to exploit marketplace opportunities (Lyon et al., 2000; Ireland et al., 2001; Brush et al., 2001) and lead to the birth of new enterprises as well as growth or renewal of established organizations (Roberts and Eesley, 2009).

Therefore, the purpose of entrepreneurship education in the education needed to adapt to the social, economic and cultural development, in addition to educated formation of good mental qualities and personality traits, but also need to develop the actual ability to work and hands-on skills, students of social adaptation and a wide range of adaptability, to become the next social industry talent. Entrepreneurial abilities, including professional and technical capabilities, business management and social communication skills, and ability to solve practical problems, the information acceptance and processing capabilities, and the ability to grasp opportunities and create opportunities for integration.

2.3. Application Program of Academic Innovation and Creativity in NPIC

Taiwan's economic development over the past relies on the development of the manufacturing and industrial sectors, but services industry and employment having enhanced the proportion of economics. The program "Application Program of Academic Innovation and Creativity" was provided by the Ministry of Economic Affairs in Taiwan, ROC. It was in line with the Taiwan's government policy and industry trends, emerging service industries by applied information and communication technology through innovation and entrepreneurial activity.

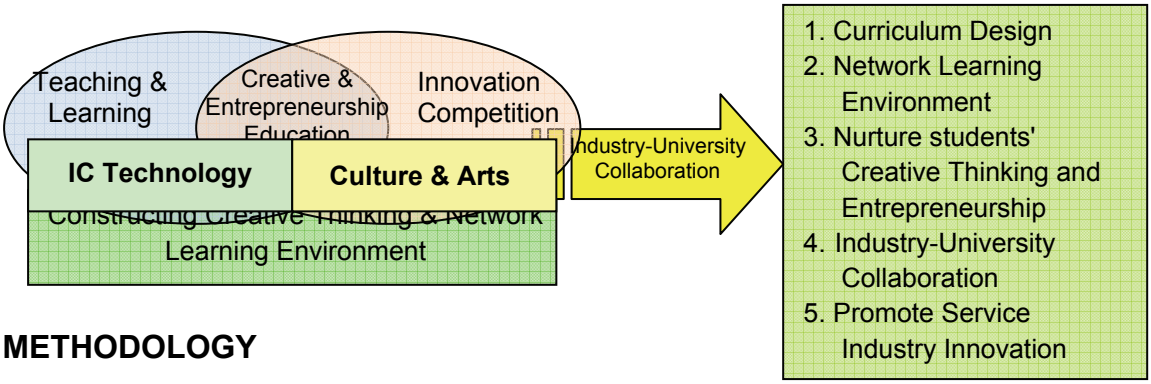
This program encouraged the young students to be creative, and more closely linked industry and campus' creativity, innovation and entrepreneurship activities. The program of work items in National Pingtung Institute of Commerce (NPIC) include:

- *Integrating creativity and entrepreneurship courses program*
- *Innovation and entrepreneurship management workshop*
- *Creative environmental planning and implementation*
- *Holding innovation competition*
- *Establishing an exchange platform of innovation and entrepreneurship*

We used case-study research to examine whether innovation competition fosters student technology-application ability. National Pingtung Institute of Commerce (NPIC) is one of three public business technological schools in Taiwan and the only one located in Southern Taiwan. Technological and vocational education in Taiwan emphasizes pragmatic learning while creating a unique schooling system to meet the needs of contemporary society.

We selected a business-technological school instead of industrial and technical schools to apply science and technology in a selected school. We attempted to improve student cognition in science and technology applications through an observed creative contest. The Taiwanese government is making great efforts to promote cultural and creative industries. The expectations of culture and technology in all levels of life do not need the concerted efforts of the non-tech sector to contribute to the development of cultural and creative industries.

Picture 1: The framework of program by NPIC



3. METHODOLOGY

The case-study method has a long and respected history in the social sciences. There have also been seminal examples of case research within the management literature. The philosophy and implications of the case-study method have received considerable attention in the methodological literature and

there are a number of standard texts on the approach (Perren and Ram, 2004). Also, case studies are especially useful for researching phenomena, where little empirical evidence is available and to answer the how and why questions regarding these phenomena (Yin, 2003).

In this research, case-study analyses were derived from collecting competition projects, selecting experts, the appraisal index, independent scoring, grading statistics, and analysis. It focused on relation analysis and effective discussion between creative curriculum planning through creative competitions held on campus. The research process used content analysis by expert assessment.
Content analysis is a research method that uses a set of procedures to make valid text inferences (Weber, 1990). These inferences involve the sender(s) of the message, the message itself, or the audience of the message. The rules of this inferential process vary with the theoretical and substantive interests of the investigator. Three experts were selected to examine the ICT application on these works.

4. ANALYSIS AND RESULTS

4.1. Reliability and Validity of Expert Assessment

Validity is the extent to which a test measures what it claims to measure. It is vital for a test to be valid in order for the results to be accurately applied and interpreted. When a test has content validity, the items on the test represent the entire range of possible items the test should cover. Individual test questions may be drawn from a large pool of items that cover a broad range of topics.

Research validity refers to measurement correctness and the extent to which a test measures what it claims to measure. A test must be valid to accurately apply and interpret the results. In some instances where a test measures a trait that is difficult to define, an expert judge may rate each item's relevance. To obtain measurement-validity correctness, 2 of the 3 selected experts in our study have a computer-degree background and have been engaged in ICT-related work, and the other is a senior lecturer in information sciences. However, reliability refers to measurement trustworthiness and to testing consistency and stability. The study is validated through different analyses to test the reliability.

However, research reliability has to do with the quality of measurement. It refers to the "consistency" or "repeatability" of a measure. The experts evaluated ICT application on campus innovation-competition from 1 to 5 points. Team obtaining only 1 point means no ICT technology was applied on creative works, whereas 5-point teamwork means a high ICT application on creative works. We compared the changing trend of teamwork points per year for the three years.

Three experts scored each teamwork, followed by independent tests to understand scoring differences. The outputs are shown in Table 1. The value of $\chi 2$ at 2.0654, denoted no significant difference in the scoring appraisals among experts. The content analysis of teams by difference experts had consistent appraisals and impartial judgement. Thus, the research reliability is acceptable.

Table 1: ICT technology application scores (unit: points)

Year	1st Year (10 cases)	2nd Year (11 cases)	3rd Year (9 cases)	Subtotal
Expert A	**22**	**29**	**28**	**79**
Expert B	**33**	**29**	**28**	**90**
Expert C	**26**	**22**	**27**	**75**
Total Points	**81**	**80**	**83**	**244**
Average Scales	**2.70**	**2.42**	**3.07**	**2.71**

4.2. ICT Technology Application Scoring

These score results of the three years are summarized in Table 2. The technology level mean value of creative teamwork is 2.7 the first year and 2.42 the second year. In the final year, ICT application level on creative teamwork reached 3.07 average points. Consequently, each creative team with ICT technology application increased over time.

We further tested the three-year average score by one-way ANOVA, showing that the average-score differences of the three years were statistically non-significant (F = 1.125, F0.01 = 6.11). This means

that the average ICT score of the three years had non-significant differences. However, the average technology level (ICT application level) of these competitive works was incremental. The technology level mean value of creative-teamwork was 2.7 in the first year and 2.42 in the second year. In the final year, ICT application level on creative-teamwork reached 3.07 average points, showing that each creative team with ICT technology application increased over time.

The cognition change of college students and the number of creative proposals produced on campus through objective evaluation created new engineer education directions and suggestions. The results suggest that those who win competition awards have higher motivation and potential to create business models for new-technology service and new directions for college teachers or staffs to plan environment design and projects for future college education.

Table 2: ICT technology application scores (unit: points)

Year	1st Year (10 cases)	2nd Year (11 cases)	3rd Year (9 cases)
No. 1	**1.33**	**1.67**	**2.33**
No. 2	**1.67**	**1.67**	**2.67**
No. 3	**1.67**	**2.00**	**2.67**
No. 4	**2.00**	**2.33**	**3.00**
No. 5	**2.33**	**2.33**	**3.00**
No. 6	**2.33**	**2.33**	**3.33**
No. 7	**3.00**	**2.67**	**3.33**
No. 8	**3.00**	**2.67**	**3.33**
No. 9	**4.33**	**3.00**	**4.00**
No. 10	**4.67**	**3.00**	
No. 11		**3.00**	
Average Scales(X)	**2.70**	**2.42**	**3.07**
Variance (S^2)	**1.127**	**0.496**	**0.494**

5. CONCLUSION

Creative education has positive benefits to not only improve student creativity, but to also enhance student problem-solving ability and discipline capacity. Creative education must continue to develop, to construct schools and communities in a creative cultural environment. Wu (2002) indicated that creativity does not belong to genius, but can be learned. Runco (2004) asserted that everyone has creativity potential through education and other means. More scholars believe that training and other methods enhance creativity.

This study only collected innovation competition records for 3 years. The results show no statistical difference in creative contests for ICT applications. Extending the research period (at least 5 or 10 years), could provide more evidence to identify the obvious importance of innovation competition as a critical factor in influencing students in business schools to apply ICT technology in human life or working environment services/ products design. School creative contests establish a creative environment, which contributes to social learning among students.

This study constructs a foundation for ongoing research in creativity and consolidates the theoretical knowledge base by strengthening ICT application, local features, and educational practice of a creative college education in Taiwan. In the current rapidly-evolving global economy, the concept of creativity and innovation is getting a makeover. Many industrial firms recently build a suitable environment and supply a better incentive measure to encourage staff innovation. Future industry-university cooperation will spread student creative works to industry, commercialization, or industrialization. Innovation competition ultimately excavates good creative works.

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