

# Vision Development in Engineering Education during Financial Crisis and Natural Disasters

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## Abstract

Risks are seeds of new opportunities. The year 2008 is heart-breaking to global nations. University undergraduates are ambitious, yet within a fortnight after their summer vacation, their sweet day dreams have turned into nightmares. Many youths may indeed become desperate. The University of Hong Kong realizes this impact to their engineering students. Making use of broadening education, the University utilizes recent case studies to make their engineering students observant and alert. The present economic downturn and non-ethical practices provide good lessons in building up maturity and morality in fresh engineers. In the business world, and history recalls, an end in a road is never a dead-end when there is a turn to another road. The one who finds this turn first shall master tomorrow. Hence we enhance students' vision in exploring new business opportunities. We encourage the whole curriculum to make entry to entrepreneurship competition, and to enroll in visits to places devastated by natural disasters. Through critical thinking and "seeing is believing", we develop algorithm and passion in these youths to serve the new society with a good heart either through entrepreneurship or engineering or their integration. Already we see maturity substantially in the batch.

**Key words:** Management education, engineering management, financial crisis, business environments.

## 1. INTRODUCTION

The year 2008 was an atypical year. There were successful achievements like the Beijing Olympic and the first space-walk by astronauts from China. There were historical changes such as a new president was elected in the United State. Whilst these regular events that happen every four years and prompt us to advance forward, nevertheless, there were artificial and natural disasters, such as the global financial tsunami and Sichuan earthquake happened in the same year. There were many industrial recalls that seriously affect suppliers' business and consumers' health. By domino effect, crisis and risks were propagated to individuals and entities. Unfortunately, the poor souls of the world were unprepared for the terrific loss and abrupt changes, not to mention that even professionals had been quite ignorant and possibly unethical when the tsunami was building up its destructive energy development. People were aware of the incident until it really hit. Many of us lost our life expectation and direction. And few of us, including experienced managers, had contingency plans to cope with the instability.

The Department of Electrical and Electronic Engineering of the University of Hong Kong (HKU EEE) realizes the impacts of these crisis and disasters to their engineering students. We also understand that these risks are seeds of new opportunities. Making use of broadening education, the University utilizes recent case studies to make their engineering students observant and alert. The present economic downturn and non-ethical practices provide good lessons in building up maturity and morality in fresh engineers. In the business world, and history recalls, an end in a road is never a dead-end when there is a turn to another road. The road may require a new order. The one who finds this turn first shall master tomorrow.

## 2. EDUCATIONAL VISION AND AIMS

Hence we enhance students' vision in exploring new business and self development opportunities. We encourage the whole curriculum to make entry to entrepreneurship competition, learning through servicing others, and to enroll in visits to places devastated by natural disasters.

Through critical thinking, professional excellence, leadership and peer collaborations, we develop algorithm and passion in these youths to serve the new society with a good heart. These learning outcomes were achieved by a series of educational activities which aligned with one or more of the six-core educational aims for higher education identified by the University [1].

These aims are:

- i) Aim 1: Pursuit of academic / professional excellence, critical intellectual enquiry and life-long learning
- ii) Aim 2: Tackling novel situations and ill-defined problems
- iii) Aim 3: Critical self-reflection, greater understanding of others, and upholding personal and professional ethics
- iv) Aim 4: Intercultural understanding and global citizenship
- v) Aim 5: Communication and collaboration
- vi) Aim 6: Leadership and advocacy for the improvement of the human condition

The six aims formulate a whole person education.

### 3. ENTREPRENEURSHIP AND PERSPECTIVE DEVELOPMENT

*When there is no opportunity, create one with entrepreneurial sprits.*

While the employment market is so unclear, the unemployment rate is rising, and graduate job opportunities are reducing, it is important to motivate students to create their own opportunities. Instead of waiting for rabbits under a tree, students are encouraged to hunt for their futures and establish alternatives besides jobs.

In the classroom, courses like *Business Venture* and *Success in Entrepreneurship* are offered. Examples of leadership are studied. Beyond the classroom, we explore opportunities to develop their business vision and skill in presenting marketing statement. We draw them to closer to practical scene. For example, in recent years, many prestige organizations held different kinds of entrepreneur and business plan writing competitions for higher education students. Usually, these competitions were

contests exclusively tailored for business students only. In order to equip engineering students with practical business senses and entrepreneurial sprits, the HKU EEE Department encouraged and supervised a team of Electrical Engineering students to participate in the HSBC Young Entrepreneur Award [2]. The team applied their engineering knowledge to develop a new entrepreneurial business on “Green Roof Engineering” and won the Silver Award, which was the first time that engineering students won such award in their history. This learning activity can align with the first educational aim which sustains students’ intellectual curiosity and enthusiasm for learning and helps students to pursuit of professional excellence and encourage critical intellectual enquiry. It can also foster students to work with others and make constructive contributions, strengthen their communication and collaboration skills which achieve the fifth aim.

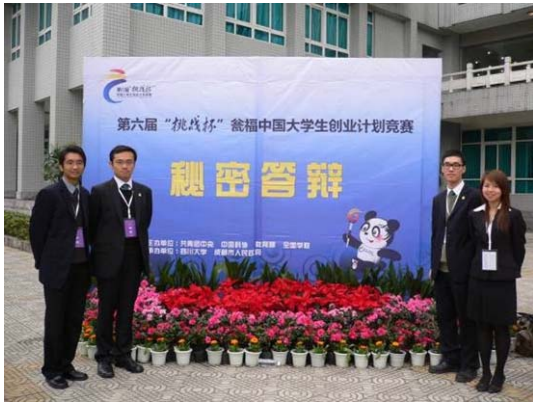


*Photo 1. An electrical engineering student was trained in front of camera and HSBC CEO to present their technological entrepreneurial idea*

In order to develop a wider and more nationalised vision in engineering education, students are encouraged to take challenges outside Hong Kong. Another team of Electrical Engineering students were encouraged to participate in the 6<sup>th</sup> National Challenge Cup held in Sichuan in November 2008. The Cup was a national competition on starting an enterprise among university students in China organized by Central Committee of the China Communist Youth League, China Association of Sciences, Ministry of Education and National Academic Association and co-organised by Sichuan University and Chengdu Municipal Government.

This learning activity gave our students an opportunity to apply their technical and engineering skills to develop a new product or service in the market. The HKU EEE team won the Silver Award among the 600+ teams. The teams participated in the competition came from 356 universities and colleges in 31 provinces in China. This learning opportunity helped to simulate engineering student’s critical self-reflection with greater understanding of others,

especially other students from other provinces in China, which achieve the third educational aim of higher education [3].



*Photo 2. Engineering students' exposure were widen through national competition held in Sichuan Nov 2008*

Financial tsunami is a global issue. Beyond the national vision, a globalised vision is our wider goal. Presently the university admits more and more international students, besides the highly internationalised staff force that has already been employed. The interaction with people and thoughts from many parts of the world is favorably enhanced.

The impact of the tsunami was broad and serious. Prudently the HKU EEE Department compels our students to receive financial management training since the year 2000. The course enables them to understand aspects of the financial crisis in business organizations; and to build competence in their future financial execution.

#### ***Seeing is believing.***

The HKU EEE Department continues to require our students to benefit from industrial internship during the summer after their 2<sup>nd</sup> year study. The training period is normally 4 weeks to 8 weeks. The glimpse of on-job training develops sense of responsibility and makes them better prepared for their final year projects. Aggressive students may apply for a one-year internship. The longer exercise can generally develop higher team-spirit, better interpersonal skill and sensible leadership.

Recent observation indicated that China has been among the first batch of nations climbing up from the trough of the crisis. The course: *Business Venture in China* requires all students, about 55 in number, to enroll to at least one business opportunity exploration visit in China. Three major cities: Shanghai, Guangzhou and Shenzhen were selected, and the visited spanned for one day to three days. In each of

the visits, platforms of business opportunities were explored; and where appropriate, successful enterprises were consulted for advices. The course aimed to develop value chain vision and entrepreneurship spirit for the new world, with Mainland China as a place of starting thoughts.

Besides the above seeing opportunities, Sichuan and Ghana will be two of the other forthcoming events for building up wisdom and lookout in our students.

#### ***Challenge crisis and prepare contingency***

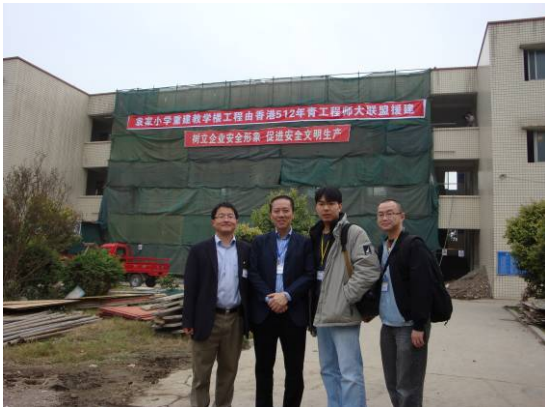
The year 2008 left us with many successful models and failure examples. Selected cases, with modifications were studied and discussed in classes. The students were encouraged to explore alternatives through role plays. They learnt the causes and environments that led to those successes and failures. And the exercise made them more insightful in risk and opportunity management. Despite it was simply classroom training, the experience developed their confidence and expert power in facing crisis, and in preparation of contingency plan. After all, we expected many of them would become managers, who would then lead their subordinates to overcome any adversity in their career. As some of the 2008 issues were ethically linked, and substantial others were controversial circumstances, the case studies also worked as a good platform to polish their social sensitivity and ethical awareness. It was believed that a tough character, a set of rules and a problem-solving algorithm had been developed in the students who actively participated in the role plays.

## **4. BUILD THE NEW WORLD**

#### ***Destruction is another start of reconstruction and revitalization.***

Sichuan, China is not just a place for entrepreneurial education. This place aroused care and concerns from everyone in everywhere of the world in 2008 as a result of the destructive earthquake happened in Sichuan on May 12, 2008. Being teachers devoted in engineering education, teaching students professional ethics and awareness of self-responsibility to contribute society during critical and adverse situation is equally important. A learning opportunity through servicing in reconstruction work was organized. Over 40 students will be led by HKU EEE teachers to Sichuan in the summer of 2009 to install multimedia classrooms, e-learning laboratory, satellite education TV system and renewable energy system for a reconstructed school in Deyang [4]. They will learn new technical knowledge and hands-on skills to install these systems in the school by themselves. This learning activity

can train students to respond positively to unanticipated situations and problems as well as to identify and define problems in unfamiliar situations.



*Photo 3. HKU EEE teachers Dr. Wilton Fok, Dr. YC Wu, Dr. Alfred Yu, together with Dr. Raymond Ho, Legislative Councilor of Engineering Constituency, inspected the progress of the school reconstruction*

The project provides an opportunity for students to tackling novel situations and ill-defined problems which accomplish the second educational aim. Through the practical and love-devotion event, we expect the students enhancing their problem-solving and decision making skill as specified by the second aim. And most importantly, we nurture their hearts for the society, and plant ethics and philanthropy in their minds as specified by the fifth aim. At the same time, the sixth aim can be attained as this project can train up students' leadership and advocate the improvement of human conditions. Students played a leading role in improving the well-being of the students' condition and learning environment in Sichuan.

### ***Beyond the region***

In the 21<sup>st</sup> Century, one very important vision for engineering education is the development of a social and intercultural skill to understand global citizenship. Every students and teachers in higher education are required to learn these skills to prepare for the new challenges resulted from globalization; engineering students are with no exception. An associated project of the Sichuan reconstruction project will be conducted in July 2009 to link students between Hong Kong and Ghana in Africa together. HKU students will travel to Ghana to install e-learning system and conduct an on-line interactive real-time teaching activity with HKU EEE teachers and students.

This activity can heighten awareness of the students' own culture and other cultures. It can also develop cultural sensitivity and interpersonal skills for engagement with

people of diverse cultures. As a result, a vision of performing social responsibilities as a member of the global community can be developed and the fourth educational aim: Intercultural understanding and global citizenship, can be developed. In addition, through this project, students can participate actively in promoting the local and global social, economic and environmental sustainability, so that they can learn leadership skills and advocate for the improvement of the human condition in Africa. Hence, the sixth educational aim can be achieved.



*Photo 4. Students contributing their technical expertise to build the new world*

## **5. CONCLUSION**

Engineering education is now facing radical changes. Traditional classroom teaching and learning activities are no longer sufficient for training all-rounded engineering students. Teachers from the Department of Electrical and Electronic Engineering of the University converted risks and challenges resulted from the financial tsunami and Sichuan earthquake into valuable teaching and learning opportunities. These learning opportunities were started locally in Hong Kong, later on extended to Sichuan in China and then even further to Ghana in Africa. The associations of these opportunities were not well-planned at the very beginning but their interrelationships were naturally created. It illustrates a fact that opportunities were very often not well planned and scheduled. No one knows when will be the next financial tsunami and where will be the next major earthquake. But well-prepared students will always be the first who can catch opportunities and to succeed and recovered after crisis and disasters. This new vision should be developed and promoted in higher engineering education in the new century.

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