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Review on the Development of Design Education in Hong Kong: The Need to Nurture the Problem Finding Capability of Design Students

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Recent researchers have pointed out that designers should not only be able to solve problems, but also to find and identify them. Many design curriculum publications and syllabi also have unequivocally indicated that design students should be able to identify and state clearly the needs and opportunities for design activities through investigation of the contexts of home, school, recreation, community, business and industry. However, "problem finding" is still a deficient area in Hong Kong design curricula. By conducting a comprehensive review on the development of design education at secondary and tertiary levels of Hong Kong, this paper traces the changes in the objectives and learning activities within design education, and identifies the reasons behind

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them. By identifying the critical changes in the nature and requirements for jobs, social matters and educational objectives, this paper further urges the need to nurture the problem-finding capability of design students.

Key words: problem finding, design curriculum, educational change

Introduction: Needs for Creativity and Innovation Elements in Education

Because Hong Kong lacks natural resources, its development relies heavily on industrial production and economic activity. As a result, Hong Kong society reacts in a sensitive and dynamic manner to social, political, economic and technological changes in other countries and regions. For example, since the 1960s, Hong Kong has changed its focus from an entrepôt trading post to a manufacturing oriented economy, then to a combination of manufacturing and service industries, and finally to become the international financial centre as it is today (Chan & So, 2002; *Hong Kong Annual Report*, 1986, 1990, 1996; Hong Kong Trade Development Council, 2000; Mo, 2006; *The Policy Address*, 2001; Turner, 1989).

Due to the decline of the manufacturing industry, the government expects Hong Kong to develop its industry with more emphasis on creative thinking and high-tech innovation (Innovation and Technology Commission, 2004; Innovation Technology Centre, 2004). Thus in recent years, the term "creativity and innovation" has become a key factor (as well as a fashionable term) affecting not only Hong Kong's industrial development, but also its education policies and directions, as well as the whole development of the city. As clearly indicated in the Policy Addresses of the Former Chief Executive of the Hong Kong Special Administration Region, Tung Chee Hwa, regarding his expectations of education: "Creativity and innovation" are one of the major driving forces of economic growth (*The Policy Address*, 1998, 2001).

When talking about the "creativity" and "innovation" elements in education, what first comes to mind is the design programmes and related subjects, and indeed this is what has happened, particularly in the past 15 years, during which people have considered the trends and quality of design education in Hong Kong much more than they ever did before. For example, starting in the mid 1990s, the Curriculum Development Council (CDC) and the Education Department (ED) faced increasing criticism of the slow pace of reform in secondary level design curricula. Since the early 2000s, the boards of directors of tertiary institutes and the University Grants Committee (UGC) have also received pressure from the public, in particular from the design and manufacturing industry, suggesting that design curricula need to be critically reviewed and then changed to meet rapid social and industrial changes (Lau, So, Justice, Lee, & Townson, 2005; Siu, 2005; The Hong Kong Polytechnic University, 2003).

Many people have recognised the significance of design education, particularly the programmes and courses that offer more creativity and innovation elements. For example, since the late 1990s, hundreds of design-related short courses have been offered both to students as extra-curricula activities and to working people as further studies. Moreover, apart from a large number of design-related courses offered by private design schools, many new UGC funded, subsidised and self-financed full-time and part-time programmes have been initiated in tertiary institutes with the titles that include the term "design".

However, is the implementation of increasing design programmes good enough? While policymakers and educational administrators input large resources and try hard to bring larger numbers of programmes and students in design education, what is missing within the design curricula that significantly and directly affects the quality of design education?

Design Education in Hong Kong

In Hong Kong, all levels of education have claimed to have some design-related elements in their curricula. Nearly all subjects at all levels claim to include "creativity and innovation", as well as problem-solving knowledge and skills in their curricula and activities. Nevertheless,

according to the official terms used in the education departments and councils, design education in Hong Kong can be considered to be formally offered only at secondary and tertiary levels (Siu, 2002a).

Some people may identify art and design subjects offered in early childhood education and primary education curricula. Strictly speaking, these subjects and activities can be considered as "creativity and innovation related subjects". Most of the time, these subjects and activities are related to craft and fine art elements. This situation can easily be understood by some common Chinese titles/terms of the art and craft related subjects or activities in primary schools and secondary schools: "美術", "勞作" and "手工".

To have the topic more structured, and to generate a more focused discussion, this paper is confined to and focused on design education provided in Hong Kong secondary schools and tertiary institutes. As stated, this definition of design education is officially and commonly accepted by the government and the education system in Hong Kong (Curriculum Development Council, 2000, 2005; Fung, 1997; Martin et al., 2003; Siu, 1994, 1999, 2002a).

Early Development of Design-related Subjects

The history of formal design-related subjects taught in educational sectors and schools in Hong Kong can be traced back to the 1920s. At that time, "design" was not a common or popular term for a subject or area as it is in the curriculum today. Instead, people liked to consider crafts, design and technical elements as "technical subjects" (Siu, 1994, 2002b; Turner, 1989). It is also the reason that up to the late 1970s, design related subjects were only offered in the technical schools or institutes (工業中學, 工業學院, 工專). In Chinese, "工" always associates with the meaning of work, craft and technical technique.

Apart from the traditional Chinese-style apprentice training, formal design-related subjects (that is, craft subjects) were first offered in the 1930s. The first industrial school, the Aberdeen Industrial School, established in 1935, is a good example that illustrates the early design and technical education development of Hong Kong. At that time, the school offered apprentice courses lasting three or six years in mechanics,

cabinet making, tailoring, and shoe making to students who had completed their elementary studies. Besides providing industrial training, the school was also designated by the government as a reform institution.

In 1952, the Aberdeen Industrial School was renamed as the Aberdeen Trade School. This change marked a milestone in skill training in Hong Kong in that industrial schools would no longer strive for practical correctional training. The subjects offered at the trade school included handwork, with the following subject elements: bookbinding, carpentry, metalwork, pottery, leatherwork, paperwork and carving (Aberdeen Technical School, 1985). The emphasis of the subject matter and learning activities is on handcrafts and skills rather than creative thinking or problem solving.

Design-related Subjects at Secondary Level

In 1955, formal public examinations for technical subjects started to be implemented in Hong Kong. The examinations established a critical milestone for the subjects. In 1957, the Aberdeen Trade School took the first step towards becoming a technical school by again changing its name, this time to "Aberdeen Technical School". From 1955 to 1964, more technical schools equivalent to the current secondary level were established. Students in these technical schools could take the craft subject handicrafts stream, in which they could select two out of six choices, including pottery, toy making, leatherwork, book-binding, weaving and embroidery. Students could also take one of the following technical subjects: (a) woodwork or metalwork, (b) geometrical and mechanical drawing, or (c) dressmaking.

In 1960 and 1961, there were five "modern schools" established to provide training in craft and technical subjects. They claimed to provide pre-vocational training at the secondary level. After 1963, these modern schools were also renamed technical schools. At their peak, there were 27 technical schools in Hong Kong. From 1965 to the late 1970s, woodwork, metalwork, practical electricity, and technical drawing became individual subjects and were offered in technical schools.

The name "technical school" is still used now, though most of them changed their names to "secondary school" in 1997. One of the major

reasons for the change is that many schools also offer science and arts subjects, so that "secondary school" more accurately reflects their nature. Another reason is that in the past, technical schools were always considered second-class schools at the secondary level. Due to the nature and names of technical subjects offered in the schools, many people considered that the academic standards as well as the standards of students of technical schools were not as good as other secondary schools.

As implied by the names of the technical schools and the subjects they offered, the core education aims of the subjects were to provide skill training. The so-called problem-solving skills were just skills necessary to finish assigned technical tasks or technical routines. Students were mainly required to acquire skills and practical experience in preparation for earning a living (Siu, 1997). Even until the mid 1970s, students in technical schools and some pre-vocational schools also attended classes in skill training that included a great deal of routine and repetitive drills. The students' performance was mainly assessed on their familiarity with certain skills, and their accuracy in required work (that is, with predetermined solutions and outcomes). In short, students were seldom offered problems to be solved on their own initiative.

With respect to curricula, the subject matters of most of these craft and technical subjects were mainly adopted from the United Kingdom's early curricula, which had not been revised for many years. For example, the curricula in woodwork and metalwork that were used for several decades in Hong Kong did not undergo any great changes until the mid 1970s, when many workshop facilities were also imported from the United Kingdom.

Public examinations in woodwork, metalwork and practical electricity started in 1955. The examinations for each subject consisted of three papers: drawing, theory and practice. "Practice" was an important part of examinations of some technical subjects. The students needed to finish an assigned technical task within a period of time. The major and only assessment criterion was the workmanship of the students. The nature of these examinations in fact affected the contents and development of the curricula of the design-related subjects for many years, even today (Martin et al., 2003; Siu, 1994).

Before the 1980s, teaching and learning activities in many of the schools offering technical subjects focused on the technical aspects. Due to a revision of the curriculum, the examination syllabi and new teacher-training methods, more attention has been put on the design and thinking elements (Curriculum Development Council, 2000, 2005; Siu, 2000, 2002a). Activities are more flexible and more varieties are provided to the students.

To promote students' problem-solving skills, a new subject, Design and Technology (D&T), initiated in the United Kingdom, was introduced in Hong Kong in 1975 and implemented concurrently with conventional technical subjects for secondary level students. According to the original plan, the conventional technical subjects characterised mainly by skill drilling and technical knowledge would be gradually replaced by D&T. In 1975, D&T was offered to Secondary Four students who had taken woodwork and metalwork, and as a new subject to Secondary One students. The subject has been offered until the present, even though the syllabus has been revised several times (Curriculum Development Council, 1983, 1991, 2000, 2005).

The core aims of D&T in Hong Kong are claimed to foster and develop the creative, intellectual and technical abilities of students through the use of materials and the application of technological knowledge (Hong Kong Examinations and Assessment Authority, 2002a, 2002b; Leung, 1998; Siu, 2001b). In detail, D&T is expected to enable students to achieve design and technological literacy through the development of:

- Design and technological knowledge and understanding,
- Communicating and problem-solving capabilities,
- Design and technological capability, and
- An understanding and awareness of the relationship between design/technology and society (Curriculum Development Council, 2000).

As clearly indicated in the syllabus of the subject, the design process (mainly problem solving and realisation) is considered central to such development (Hong Kong Examinations and Assessment Authority, 2002a, 2002b, 2005).

D&T has not been a compulsory subject in Hong Kong, though many local educators and teachers have claimed that the problem-solving skills in the subject should be learned by all students (Siu, 1999, 2001b; Volk, Yip, & Lo, 2003). Schools can determine their curriculum under the School-based Management (SBM) arrangement, in which the Education and Manpower Bureau (EMB) delegates authority to schools.

Advanced Supplementary (AS) Level on D&T has been available for Secondary Six and Seven students in several pre-vocational and technical schools since the late 1990s. To provide a different D&T curriculum to suit the needs of different types of schools, the D&T (Alternative Syllabus) is offered in some schools. This curriculum is more technology-oriented, in that more advanced facilities are required, and schools have the freedom to opt for it if they can provide the resources and facilities (Hong Kong Examinations and Assessment Authority, 2005, 2006; Siu, 2002a).

In sum, at the secondary level, design-related subjects have been changed several times from traditional craft and technical subjects in the 1920s to D&T in the late 1970s. It is a fact that D&T has been able to fulfil most of its original objectives, though it still has some limitations that will be discussed in the following paragraphs. Nevertheless, D&T offers a new direction and environment where students can have more opportunities to practice their problem-solving skills. At the present moment, the syllabi of D&T and other design and technology-related subjects are still under review and are planned to be further modified.

Design Programmes at Tertiary Level

Until the early 1990s, universities in Hong Kong were still considered places for a small number of elite students. If other students wanted to further their studies after secondary school, they had to go to government-funded or subsidised institutes, private institutes and colleges, or study abroad. At that time, although many curriculum planners, coordinators and teachers declared that thinking skills were important in their programmes, creativity and innovation in fact were not so commonly emphasised in the curricula. Moreover, the meaning of

problem-solving capability in general was understood as mastering the knowledge of particular subjects and then solving assigned questions and problems related to the subjects (Martin et al., 2003).

Apart from the technical and design-related subjects offered in the technical institutes, the history of design programmes can be traced back to the early 1960s. The first formal government-recognised diploma design programme was offered in 1964 by the Hong Kong Technical College. Before mid 1980s, design programmes were mainly skill based, even though the words "problem solving" could be found in many programme documents. At that time, techniques such as graphical illustration gained recognition and both local and international reputation. However, students' thinking skills, problem-solving capability and experience were continually criticised by the industry. Before mid 1990s, design programmes were only offered in non-university institutes, such as the Hong Kong Polytechnic, technical institutes, and subsidised and private design schools. The first design degree programme offered in a design school of a "university" was in 1994, though design degree programmes had been offered by the Hong Kong Polytechnic much earlier, in 1984 (The Hong Kong Polytechnic University, 2003;*University Prospectus*, 2000–2005).

Starting in the 1980s, new design trends and technologies in western countries significantly affected the development of design education, and brought critical changes in public perception of design to Hong Kong (Siu, 1994, 2005). These changes affected not only the curricula, contents and instruction methods of design education, but also the quality of the students studying them. Fortunately, most of these influences were quite positive for the development of design education and industry practice in Hong Kong. For example, design became considered as a subject in which students can "invent" something new and "see and think" something in new ways, instead of being thought of as a subject for skill training, as in the past. Design graduates' work also started to gain recognition by the industry, and their pay scales improved relative to the graduates of other disciplines. More parents then started to allow their children to study design and choose it as a career. Together with the attractive images and lifestyle of designers that appeared in the mass media and the example of some successful local

designers, more and more young people wanted to get into the design field for a long-term career.

Tertiary design education in Hong Kong has undergone some critical changes over the past three decades. One of the changes is that design technical skills have not been considered as the only and most important objective in design. Instead, design theories and thinking have been more emphasised. Students are also encouraged to have more contact with society instead of hiding themselves in design studios and labs. And, instead of focusing on one particular area or discipline, a multi-disciplinary approach is increasingly implemented and encouraged in the curricula. These changes in the schools and the programmes have started to attract local and international recognition.

Although creative thinking and problem-solving skills have been increasingly emphasised in design programmes in Hong Kong since the 1980s (Siu, 2001a), there is criticism that the students' thinking skills are not meeting the continuously changing needs of both the industry and society at large. In particular, since 2000, design graduates have been criticised for their lack of initiative and weakness in problem finding (sometimes called problem identification, need identification, need finding, or design opportunity identification). Moreover, the Policy Addresses of the Chief Executive (1998, 2001), including the several speeches about the management matters of Hong Kong by the Prime Minister of the PRC in 2007 and 2008, stated that Hong Kong is expected to be a place that nurtures manpower for front-end creative and innovative industry, such as interactive multimedia and high-tech innovative design. All of these factors increase the pressure to reform design programmes still further, particularly in the area of critical thinking. Nearly all agree that it is necessary to have further reform and change in design education; consequently, it is a critical time and opportunity for design educators and designers to ask two key questions:

1. What kind of things are the current design curricula still missing?
2. What areas of current design practice and education should be improved and enhanced?

New Need in Design Curricula: Problem Finding Knowledge and Experience

As discussed in the review above, the current design curricula have some critical changes and improvements to consider, in particular in the problem-solving knowledge and experience. However, the curricula still lack plans and elements to nurture students to undertake more initiative, in particular to awaken their problem-finding capability. For the past two decades, more thinkers and educators have agreed that problem finding is a critical stage in the entire thinking and design process. It is a fundamental issue, without which there would be no problem to be solved (Dudek & Côté, 1994; Jay & Perkins, 1997; Robertson, 2004; Runco, 1994, 2003, 2007; Starko, 2000; Treffinger, Isaksen, & Stead-Dorval, 2006).

As early as 1929, the well-known scholar John Dewey (1929), widely considered the father of progressive education, identified the act of discovering the problem as the first step in knowing, and the first step in creative activity and problem solving. In his classic *The Evolution of Physics*, the great scientist and inventor, Albert Einstein (1938), asserted that "the formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill". He further identified that to raise new questions, to discover new possibilities or to regard old problems from a new angle requires the imagination that marks real advance in science. In *Productive Thinking*, Max Wertheimer (1959) identified that the function of thinking is not only the solving of actual problems, but also the discovering of new one. He further pointed out that envisaging and formulating the productive question is often a more important and greater achievement than finding the solution to a set question. In *Originality*, Norman Mackworth (1965) also pointed out that an activity like problem finding would seem to be close to the heart of originality in creative thinking. Similar to Einstein and Wertheimer, Mackworth emphasised that problem finding is much more important than problem solving. In particular, most of the time problem finding is related to "initial discovery" (see also Csikszentmihalyi & Getzels, 1970; Runco, 2003; Siu, 2002b).

In addition, in *Creativity's Compass*, Jay and Perkins (1997) stated that the act of finding and formulating a problem is a key aspect of creative thought and performance in many fields. They declared that problem finding is an act that is distinct from and perhaps more important than problem solving.

In short, few would dispute that a person who is good at generating creative solutions to defined problems is a creative thinker. However, if neither this person nor any other can find a problem for this "creative" person to solve, his or her creative as well as critical thinking talent would never be expressed (Robertson, 2004; Runco, 2007). In other words, without people who discover problems, there would be no creative solutions. Also, a good thinker can be a person who is able to solve problems creatively, but equally one who can critically find problems using his or her initiative.

Critical Changes and New Needs

The changes of society in recent years bring problem finding as the new needs in design curricula to be more obvious. Since early in the last century, particularly during the growth of modernism, scientific invention and technological development have become utopian goals, not only in schools but also in the wider world. Industrialisation made the training of skilled labourers become one of the core aims of many schools, in particular those offering education to the lower-class sector of the population. Further, in countries or cities such as Hong Kong which lack natural resources, training manpower to service the needs of the mass production industry seemed essential in education, and sometimes the only reason for its existence.

For about the first seven decades of the last century, educational goals in Hong Kong were simple and direct. Excepting conventional British-style university education for a small number of students, most other students and apprentices were in general trained in skills that met the needs of local industry. Therefore, the subjects or areas for training were very specific and limited. As pointed out by Turner (1989), at that moment, industry in Hong Kong was very passive. Its nature, development, existence and survival solely depended on "orders" and

"requirements" such as the well-known plastic flower production for markets in North America and Europe in the 1950s and 1960s. Similarly, areas and subjects of training were also very passive and dependent on the needs of local industry.

Changes in technology in Hong Kong at that time were not as rapid or dramatic as today, although scientific inventions and technological developments quickly blossomed after World War II (Mo, 2006; Siu, 2005; Turner, 1989). Thus, the curricula and subject materials of craft and technical subjects did not need to be constantly revised, and the facilities available in schools did not become outdated as quickly and easily as they do today. The area of coverage of the curricula was also not as wide as today. Unlike today's students, who have many choices when selecting the subjects in which they are interested, students before the 1970s were required to concentrate on a few subjects and learn skills for a particular area or closely related areas (Martin et al., 2003; Siu, 2002b).

The nature of Hong Kong's industry changed slowly. Skilled labourers were needed in the production and manufacturing industry. Due to repetitive mass production, the number of people working in supervisory roles was relatively smaller than today. In other words, there was no significant need for people in decision-making and supervisory positions to *initiate* anything new. As pointed out in an interview with a manager of a textile and clothing production factory, in the 1960s and the 1970s, a supervisor (or, as he called it, a "line production foreman") could supervise more than 200 workers in a production line (Siu, 2005). Therefore, the need for people with decision-making capability was very limited. What a factory needed at that time was well trained or easily trained labourers. Maintaining a young and strong labour working team was "the key to win in the market".

A Need of Change

All of these factors resulted in more stable education policies and curricula for craft and technical subjects. Policymakers saw no need for rapid changes in the way they produced students whose skills fitted the

needs of society. These stable policies and curricula also allowed schools to survive long enough to educate or train more students. Furthermore, the government and the schools also received little pressure from the public to revise curricula, learning and teaching activities. Because parents' lives were hard, they had little time to consider their children's education or to criticise education policy and curricula. There were almost no pressure groups to monitor the policies and implementations of education, particularly those related to the skill training curriculum. Consequently, the government was free either to change or not change educational matters.

However, starting in the late 1970s, there were critical changes in several aspects of Hong Kong that brought new needs in industry and education. The following paragraphs explore and discuss the changes and needs in the design industry and education over the past several decades. The focus is on three major areas: the nature of and requirements for jobs, social matters, and educational objectives. The discussion indicates that "problem finding" should be a critical and fundamental element in design curricula and that it requires more attention to meet the new needs for and demands on design education in Hong Kong.

Job Natures and Requirements

Since the early 1980s, routine repetitive skills and cheap labour were expected from Hong Kong industry more than creative thinking in terms of problem-solving skills. A large number of small-to-medium sized design studios and companies, and some design-related manufacturing companies were established between the 1980s and the mid 1990s to provide local design services. During that time, designers in the industrial and production engineering field were mainly required to solve problems based on their technological and engineering knowledge and experience.

There have been gradual changes in the job natures and requirements in the design industry in Hong Kong over the past two decades (Innovation and Technology Commission, 2004; Siu, 2001b; *The Policy Address*, 2001; Turner, 1989). Today, besides generating

solutions in response to clients' orders, designers are more often required to *initiate* directions for design, development and production. In fact, a large portion of these small design service companies have closed during the past ten years. One of the major reasons is that they received fewer orders. Unfortunately, they can no longer lead the market or self-initiate new directions for survival.

On the other hand, in some big companies, even some of the designers are not working at the supervisory level where they are required to take more initiative and use higher sensitivity to identify opportunities for improvement. As stated by the managers and design directors interviewed for this study, some regional-sized product design companies in post-industrial societies such as Hong Kong's, are characterised by a high level of competitiveness and rapid change in the direction of development. In this context, employees are more often required to show initiative in the area of "What should be done?" rather than of "How should it be done?"

Moreover, since the late 1980s, nearly all of the factories in Hong Kong have been moved to the Chinese mainland. The concept of cheap labour production does not work in Hong Kong any more. For the past ten years, even original equipment manufacturers (OEM) have also not existed successfully. It is also the reason that many well-educated professionals such as product and industrial designers and engineers cannot find jobs in Hong Kong. For example, in 2006, more than 90% of mechanical engineering and product design graduates had to work outside Hong Kong, mainly in the Chinese mainland. To survive on the Chinese mainland with its huge manpower resources, Hong Kong graduates must rely on the strength of their problem-solving skills, initiative, talent, management knowledge and experience. In this context, good problem-solving skills are still applicable and significant, but not sufficient. As indicated by the Trade and Industry Department (2007), the Hong Kong design industry needs to develop, create and initiate their niche areas in order to compete with the neighbourhood regions and have the same pace as the rest of the world. Companies, in particular small and medium enterprises (SME), need to initiate and develop new product lines and find new markets. Individual designers need to be capable of identifying design opportunities.

In sum, as Hong Kong leaves the age of production- and manufacturing-oriented design industry and design services that operated according to provided specifications, design firms and production companies as well as many neighbourhood regions must identify the directions and opportunities that will allow the industry to survive. Designers are required to identify and bring new opportunities as assets to the companies where they work. As indicated by the interviewed managers and project managers of several design companies and production companies in Hong Kong, skills and experience in problem solving are not enough (Siu, 2005). Instead, the current expectation for designers includes their capacity to identify new directions for development in the companies where they work. As stated by an interviewed CEO of a lighting factory in Guangzhou, PRC:

> I am not worried too much about the quality of design generated by the young designers today in my company. … But I really lack good designers with capability to see what new directions and things we need to go further. Most of the time, we need to tell our clients what kinds of new lighting we can produce. … Our clients only know lighting is a potential market. They have also prepared money to invest, but they do not have much idea about what lighting they need to develop. We need to tell them.

Social Matters

People in Hong Kong have a much higher standard of living than in the late 1960s, thanks to the success of the manufacturing industry, steady stable economic growth, a stable political environment, rapid establishment of infrastructure and improving welfare services (Faure & Lee, 2004; Mo, 2006; Siu, 2005; Territory Development Department, 1993; Town Planning Office, 1988). Because of improved living standards, people's expectations about quality of life in general have also increased.

Starting in the late 1960s, rapid technological inventions have changed the daily lives of Hong Kong people (Turner, 1989). The changes exist not only in people's physical lives but also in their ways of seeing and judging. The huge number of inventions publicised by mass media has aroused people's awareness of the changing needs of

the local society and outside world. The world situation has also had significant impact on the people who are more open to and have more contact with the outside world (Ho & Ash, 2006). People have started to understand that they are entering a wisdom-driven era. Hence, many people — in particular those born after the early 1960s and who received a better education than their parents — are not satisfied to earn a living as cheap skilled labourers. They expect to be at a higher level in their work places. They also realise that to survive in such a rapidly changing and competitive city, they need to know how to take more initiative and become more self-motivated so that they can make the most of the changing world around them.

On the other hand, due to the success of family planning promotion and changes to the concept of family, most young couples' families have a small number of children. This situation has enhanced young parents' consideration and expectations about the quality of education as it affects the future careers of their children. Learning from their own experience, more parents reject the idea that their children should be skilled labourers working in factories to earn a living, as mentioned above. As a Chinese saying has it, people nowadays prefer themselves and their next generation to "use their brains rather than their hands to earn a living".

In recent years, young people have changed with respect to their ideas for their education and careers. With fewer demands for money matters from their families, young people have more freedom and choice in selecting their studies and ways of life. Instead of learning a skill to earn a living or to do routine work day by day, more young people prefer to study programmes and subjects which allow them to have more space to develop their thinking talents and express their feelings and ideas (Kwok & Siu, 2002).

Consequently, design or problem-solving oriented programmes and subjects with more space for initiation and creation are more attractive to young people (The Hong Kong Polytechnic University, 2003). Moreover, due to these changes in both education and generally held value judgements, more young people like to find their own ways of doing their jobs, instead of following orders or well-defined job requirements. Although there is still a debatable social and educational

issue whether or not this kind of thinking on the part of the young is appropriate and should receive more support, it is indeed a very common trend in the value judgements of the younger generation.

Educational Objectives

As early as the 1980s, *Regulations and Syllabuses* clearly stated the aims and the objectives of Design and Technology, namely that the subject is intended to foster and develop students' abilities in the utilisation of scientific and engineering knowledge through the technological process and in problem-solving activities (Hong Kong Examinations Authority, 1987). The syllabi of technology subjects, as well as revised syllabi and documents for curriculum review, which were prepared by the Curriculum Development Council (Curriculum Development Committee, 1983; Curriculum Development Council, 1991, 1999, 2000, 2003, 2005), all state that the aims of the course are:

> To develop students' ability in solving problems … to develop students' analytical and critical ability to carry out cognitive modelling to tackle problems … to develop an understanding of the basic elements of design and technology (See Curriculum Development Council, 1991, 2005)

Similarly, the National Curriculum in England and Wales also pointed out that identification of needs and opportunities must be a key area for technology students' learning (Department for Education and Employment, 1999; Department of Education and Science, 1989, 1995; *The National Curriculum for 11 to 16 Year Olds*, 2007). The attainment targets were set for the design and technology subject (that is, technology): (a) identifying needs and opportunities, (b) generating a design, (c) planning and making, and (d) evaluating. Another publication of the National Curriculum (Department of Education and Science, 1990) also gives more details on the first attainment target that students should be able to find problems — identify and state clearly needs and opportunities — for design and technological activities through investigation of the contexts of home, school, recreation, community, business and industry.

For nearly the past twenty years, the importance of problem finding has been continuously mentioned in revised curriculum documents, syllabi and consultation documents about design subjects in Hong Kong as well as in other countries (e.g., Curriculum Development Council, 2000, 2003, 2005; Gu, 2007; International Technology Education Association, 2000; Rasinen, 2003). The education documents related to tertiary design studies all recognise the importance of problem finding. For example, many educators state that it is important for students to have freedom to select topics for project assignments in technical subjects (Nicholson, 1989). So, it is clear that design education activities should not only focus on educating students to generate, make and evaluate an artefact or system but also to *identify* needs and opportunities.

Conclusions

Reviewing the development of design education in Hong Kong, it is a fact that we cannot complain too much on the past since the curricula at that moment had their reasons to stand and their ways to serve the social, educational and industrial needs. However, also tracing the change of natures and requirements for jobs, social matters and educational objectives, we cannot deny that design curricula must undergo a critical change to nurture the students who will face future changes, that is, rapid and continuous changes. Above all, providing more knowledge and experience to nurture design students to show more initiative is one of the important directions of curriculum reform and development. In other words, students need to be motivated or even required not to sit there passively waiting for missions and jobs assigned by others. Instead, they need to be active and show initiative. While our government policy, mass-media discourse and public expectation are all demanding that our design students, that is, our future design professionals, should be creative and bring breakthroughs to our society, it is a time for us to seriously review, explore and change design curricula to strengthen the problem-finding capability of design students.

Obviously, as identified in the above review of the development of design and design-related curricula over the past century, we cannot

deny that there are and will be quite a lot of limitations and difficulties in incorporating problem-finding knowledge and experience in design curricula. The short-sighted practical values always drag all of the attention that design education reforms are forced not to have long-term missions, visions and objectives. Piecemeal actions and eye-catching but short-term achievements in schools are usually unable to bring live and sustainable changes in design curricula. However, such limitations and difficulties should not be an excuse to stop promoting the long-term value of incorporating problem-finding knowledge and experience in design curricula. Therefore, policymakers and researchers should conduct more comprehensive studies, such as reviews, in order to identify the plans and educational objectives of problem finding for different times, and the needs of problem finding in design curricula at different levels. Frontier teachers and researchers should carry more action research in order to generate constructive suggestions and identify practical directions and ways to incorporate problem finding in curricula. Only through comprehensive and in-depth reviews, continuous actions, honest evaluations and initiatively and critically "finding out problems" in incorporating problem finding in design curricula can bring real benefits to design students and our society.

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