# The Rhetoric and Reality of Technology Education in Hong Kong

***15th Pupils' Attitudes Toward Technology Conference***

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> If you have the power of [rhetoric], you will have… the trainer your slave, and the money-maker of whom you talk will be found to gather treasures, not for himself, but for you who are able to speak and to persuade the multitude. (Plato, 380 BCE)

Politicians, government agencies and education authorities have long recognized and skillfully used rhetoric to present their positions. In so doing, they attempt to influence and convince the public that their proposals, actions or maintenance of status-quo are for the public's collective good and well-being. Hong Kong is no different from most other countries, with rhetorical statements espoused over the years on the need for technology education. While terminology and rationales have changed over time, the message remains essentially the same – that an educated citizenry equipped with the technological capability, understanding and awareness is required in order to meet the economic and social challenges ahead.

This paper will review selected Hong Kong position papers and reports regarding technology education, and in particular the secondary school subject of Design & Technology (D&T), arguing that the rhetoric contained therein often did not match the reality of public perception, educational commitment and/or financial backing. In this sense, rhetoric about technology education resulted in D&T programs that remained marginal in schools or not existing at all. Extrapolated from this, is that despite recent calls for technology education to now be included as one of eight required Key Learning

Areas for all Hong Kong primary and secondary students, it is most likely doomed to the same fate of the past unless this new rhetoric is backed by adequate funds, mandates and public acceptance.

**Rhetoric and Reality - The Early Years**

For as long as there has been formal education, there have been well-intentioned groups making recommendations for reform. These recommendations generally have several common aspects: those with power prescribe changes for others without power, and the changes usually apply to all teachers and students within a system (Tobin, 2002). For those with power and postulating change, rhetoric is an important device for determining the degree of public acceptance and success. Some may call it an "art" (Aristotle, 350 BCE; Hood, 2000; McPhail, 1996; Merriam-Webster, 1997), while others consider it more of a "skill" (Billig, 1987; Cockcroft and Cockcroft, 1992). Both descriptors can have positive connotations, with rhetorical prose presented in a beautiful and quality manner, or with potential negative connotations of being able to manipulate and/or being superficial.

Whether an art or skill, rhetoric involves the use of written or spoken language. For school subjects in Hong Kong that relate to technology education, over the years there have been several important government position papers published and/or public comments made. These rhetorical statements have addressed various aspects on the need for technology education, as well as matters relating to the specific curriculum. Terminology relating to various aspects of technology education have changed somewhat since the statements were made (i.e., craft, technical education, manual training, design & technology), as have the scope and content of the subject. However, what has not changed is the rhetoric for the need for such subjects in schools.

The beginning of technology education in Hong Kong can be considered starting in the mid-1800's, with boys being taught carpentry, bookbinding and shoemaking at a Roman Catholic mission house (Waters, 2002). For official government-initiated education programs, a junior technical school was established in 1932 that featured a four-year course designed as pre-apprenticeship training. After World War II and the rapid industrialization Hong Kong was witnessing, there was an awareness of the dependency on sophisticated technology and calls for an expansion of technical education to meet workforce needs (Sweeting, 2004). Since these calls were from marginal (non-power) sectors that included small-scale and labor-intensive enterprises, nothing was done - that is until the Chinese Manufacturing Association offered financial help for the government to develop a Technical College in 1955, the forerunner of the current Hong Kong Polytechnic University.

Regarding the more-generic technology education subject of Design & Technology (D&T), which is the current name for the secondary school subject in Hong Kong that provides a wide-range of hands-on activities using tools, materials and technical approaches, the antecedents of the subject started in the mid-1950s. At that time, it was common to find lower secondary technical schools (S1-S3) offering manual training or handwork courses in bookbinding, carpentry, metalwork, pottery, leatherwork, paperwork and carving (Fung, 2002). However, not all "academic" grammar schools actually offered these subjects.

By the late 1950s, with much happening in the field of education, especially due to political, economic, and demographic pressures, there were many "false starts" and mistakes made by education policy makers (Sweeting, p.155). One was the short-lived "secondary modern schools" initiative that instituted shorter courses for students that found the largely academic subjects in grammar schools to be irrelevant. In fact, the

modern schools were actually vocational in nature and included subjects such as technical drawing, woodworking and metalworking for boys. As these schools "tended to be less generously provisioned with qualified staff and suitable equipment… they were soon dismissed in the minds of many parents as a refuge for failing students and poor teachers" (p155). After four years, these schools disappeared in name, and were converted into technical or prevocational schools.

By the mid-1960s, it was recommended that as a standard specification for all secondary schools, special rooms in woodworking, metalworking and housecraft should be included (Education Commission, 1963). The degree to which these rooms were actually equipped is debatable, but there was some compliance, perhaps 50 percent of schools - enough for the Commission to make several recommendations. One of which was to have all schools expand these courses to upper secondary grades, enabling students to take Certificate of Education (CE) examinations at the end of S5. The Commission stated:

> Efforts to introduce manual training to School Certificate standard into the secondary school curriculum have so far proved unsuccessful… This is considered a serious deficiency and it is recommended that the special rooms for woodworking, metalwork and housecraft… should be used to provide full School Certificate courses for some pupils in these subjects. (p. 93)

Despite recommendations by the Education Commission for more students to participate in S4-5 programs, there was little improvement over the years. As seen in Table 1, although the total number of CE candidates for these subjects increased, as a percentage of the total number of students taking examinations, any improvement was short-lived.

**Table 1**
*School Certificate Candidature for Technical Subjects: Number (percent of total)*

| **Subject** | **1963** | **1967** | **1973** |
|---|---|---|---|
| Metalwork | 103 (1.6%) | 358 (1.9%) | 486 (1.2%) |
| Woodwork | 55 (0.9%) | 265 (1.4%) | 260 (0.7%) |
| Total No. of Candidates For All Exams | 6,334 | 18,793 | 39,658 |

**Rhetoric and Reality - The 1970s Through 1990s**

As noted by Sweeting in his historical review of education in Hong Kong, "the proliferation of policy papers and of education-related pressure groups made this period [1970s-1980s] distinctive in Hong Kong's history of education, contributing to an atmosphere in which mass seemed more important than quality, though neither the papers nor the pressure groups were themselves massive in size" (p. 237). He further suggested that "although some of the policy documents in earlier times turned out to be paper tigers, many of them in these years served as kites, flown by the Government to ascertain the strength and direction of public opinion" (p. 239).

Perhaps the major policy paper that came out during this time that was related to technology- type subjects was the 26-page *Secondary Education in Hong Kong During the Next Decade* (Hong Kong Government, 1974). This *White Paper* was tabled and passed by the Legislative Council after considerable public debate of the earlier *Green Paper*. [Note: the term "Green Paper" was changed by the early 1980s to "Consultation Documents" and "White Paper" changed to "Policy Paper"]. This *White Paper* proposed universal secondary education for all students up to S3, and expanding the goals set forth nine years earlier in another *White Paper* (Hong Kong Government, 1965) on universal primary education. The 1974 *White Paper* was also strong in its rhetoric about the need for technology education when it stated: "in junior secondary forms [Secondary 1-3], all pupils should follow the same general curriculum, of which 25% and 30% would be allocated to practical and technical subjects" (p.4). The paper expected that "the junior secondary curriculum will be designed to foster a liking for practical subjects" (p. 4). It further suggested "practical subjects [defined as woodwork, metalwork, integrated woodwork, metalwork and design, practical electricity, technical drawing, home

economics, typing and commercial studies] will be included in the common curriculum of the junior secondary course, as speedily as facilities in school permit (p. 6).

The rhetoric on the need for this emphasis was apparent in that "the Government attaches considerable importance to a build-up of technical education at the secondary level in line with Hong Kong's future needs" (p.6). However, in softening this stance, and respecting the reality and quasi-independence of schools, the paper also suggested "…it will be left up to the discretion of individual schools to *increase* [emphasis added] the proportion of time devoted to them" (p .4).

The *Guide* produced by the Curriculum Development Committee (1975) describing the planning and implementation of the new secondary education program was also timid in the timetable and compliance for including subjects such as D&T. They softened the importance and need for D&T by stating "because of the present lack of appropriate resources it is neither possible nor desirable for schools to implement the common-core curriculum in its entirety next year" (p. 4). They further suggested "the curriculum has therefore been designed as a target towards which schools are expected to move" (p. 4). As such, the recommendations made in the *White Paper* about practical subjects were reduced to a "kite", with schools left to their own to make the decisions about curriculum matters.

The lack of rigorous guidelines, mandated or enforcement resulted in schools decreasing the time for some subjects, or determining which practical and technical subjects should (would) be offered at all. According to Eric Fung, Technology Subject Officer at the Hong Kong Examinations and Assessment Authority (personal communication, December 2, 2004), there was at that time, approximately 100 percent compliance with the offering of practical subjects, although not necessarily encompassing a complete range. For

instance, only home economics, art and music might have been available in a school. Schools could also continue to offer woodworking or metalworking, even if new "D&T" facilities were placed in schools (Curriculum Development Committee, 1975).

Furthermore, practical subjects most often were allocated only two periods a week – a lot less than recommended. Complicating this was the interpretation by schools that the subject of physical education was also being included as one of the practical subjects (Curriculum Development Committee, 1975; Hong Kong Government, 1981). Later studies commissioned by the Government found grammar schools, which contained over 95 percent of the school population, averaged between 15 percent and 20 percent of the total instructional time for practical and physical education subjects, far less than the recommended 25-30 percent for just practical subjects (Hong Kong Board of Education, 1997).

By 1975, the subject of Design & Technology was slowly being introduced in secondary schools (Fung, 2002) and was "clearly related to their increasing importance within the economy" (Sweeting, 2004, p. 243). Borrowed from the curriculum developed in England, enthusiasm for this new subject was relatively high, given *White Paper* assurances for technical curriculum and facility support. In actuality, the enthusiasm for the potential of D&T soon waned, as traditional approaches of wood craft and metal working continued in most schools.

It was the release of the *Design & Technology Syllabus* in 1983 that confidently proclaimed the syllabus "proposes a major development in the materials-based subjects - woodwork and metalwork... and a move away from work narrowly concerned with the appreciation of manual skills" (Curriculum Development Committee, 1983, p.5). Notwithstanding this claim, basic skills obtained through the use of hand tools to saw,

plane, drill and fasten continued to be heavily emphasized, reflecting the facilities that existed or were still being planned.

Maintaining this emphasis, if a school had programs at the Certificate of Education level (S4-5), students could take either the CE examination for D&T wood bias (English version), D&T metal bias (English version), Woodworking (Chinese version), or Metalworking (Chinese version). Since the Chinese version of the D&T CE examination was not even offered until 1990, many schools found the English-medium examinations difficult for those few students opting for CE level studies in this "non-academic" area. For this reason, the Chinese versions of woodwork and/or metalwork were more appealing to the students and continued to be offered. In fact, the Government position on CE subject selection by students expected this differentiation, and noted that it was "suitable… some students would have a greater aptitude for practical studies, while others would be more inclined towards academic education" (Education Commission, 1984, p. 10). Figure 1 shows the lackluster trend of D&T as a subject for CE level examinations after its introduction with project work in 1977 (Hong Kong Examinations Authority, 1982; Fung, 2002).

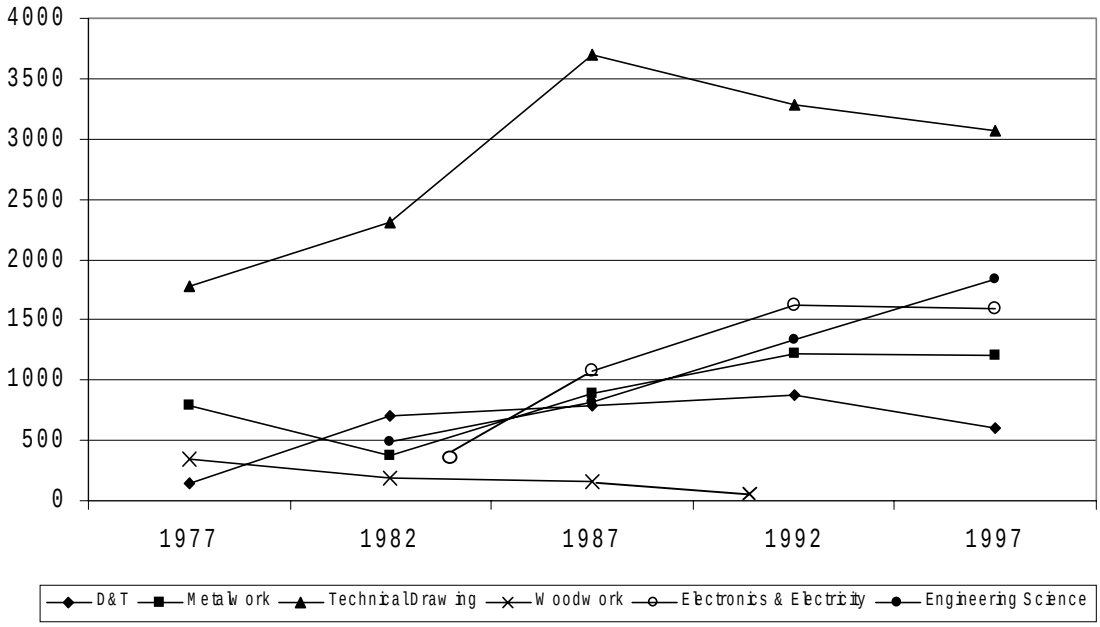


**Figure 1**

*Certificate of Examination Candidates*

*Note: 1977: First D&T Exam; 1983: First Engineering Science Exam; 1991: Last Woodworking Exam*

The problem of competing and overlapping subject content, as well as student options for D&T CE study were noted in a study conducted by Chow (1996). He found that pupils, parents and even school authorities viewed the subject as having no great value. Parents associated the subject with traditional skill training, and when their children had the opportunity to select elective subjects in Secondary 4, parents suggested or forced their children to select other subjects such as science or art. Technical subjects such as technical drawing or engineering science were perceived as being more academic and were thus more popular and successful in recruiting students than D&T. With approximately 250,000 students in Secondary 1-3 at that time, few continued studying D&T beyond this grade as an elective.

Facilities also did not change significantly from the earlier woodworking and metalworking programs. As a result, they continued to reflect the bias in the end-of-course test and potential CE examinations. For instance, even up to the mid 1990s, the

standard accommodation for D&T facilities contained two rooms, usually connected by a common passage used either for the artisan in charge or for storage. Each room was officially designated as a "D&T workshop" with a "wood bias" and "metal bias" (Education Department, 1995) and with the total size to be 325 square meters. The standard furniture and equipment list also reflected this bias, as witnessed by the headers of "wood hand tools", "wood machinery", "metal hand tools", and "metal machinery". With class sizes expected to average around 20 students, the list required the provision of 20 chisels of each various size, as well as 20 marking gauges, 20 knives, 20 mallets, 20 planes, 20 coping saws, 20 goggles, etc. – suggesting, and to some extent validating the continued repetitive and prescriptive exercises used in most programs. Thus, even the rhetoric contained in the syllabus to move away from the manual skills was not matching the reality of facilities being designed, the equipment supplied, or the activities by students undertaken in most D&T programs.

Perhaps the largest event that would impact the calls to implement and/or for the continued existence of practical subjects such as Design & Technology in secondary schools was the introduction of computers. The impact of this new technology was never imagined in earlier policy statements calling for the core practical curriculum. However, in 1982, the subject of Computer Studies was introduced in 30 pilot schools and by 1986 all secondary schools in Hong Kong offered the subject. Financial backing from the government was also very generous, such as the establishment of a HK$4 million (US$500,000) Computer Education Centre to train teachers and provide resources (Sweeting, 2004).

One major requirement necessary in order to accommodate this new subject in existing schools was the physical setting of the computer lab, with an obvious choice often being

one of the D&T labs. With D&T facilities regularly located on the first floor of a school because of material and equipment considerations, a converted D&T lab not only provided ample space and electrical power requirements, it provided a premiere location by which to showcase new (and more-respected) technology education. The pressures for resources needed to equip and maintain these new computer facilities also tended to put pressure on D&T. Computer Studies was seen as a necessary subject for all students, at the expense of other less-respected subjects. In an already crowded curriculum and school day for students, the reduction of time or options for D&T was being felt. The required practical-technical "pie" was now being sliced in different proportions, with Computer Studies commanding the largest piece being offered and served to students.

Finally, another influence on the success, implementation and development of technology education subjects such as D&T was the timetable being set for new educational initiatives before the Handover to China in 1997. Lee and Bray (1995) commented on how these deadlines affected reform. They noted "the closer the year 1997 approaches, the deadline effects become stronger and stronger" (p.370). According to the authors, initiatives were either quickly being introduced with unrealistic implementation schedules, not introduced because of an uncertain future, or not adequately funded due to potential change in policy direction. In this regard, despite the rhetoric to integrate a wider range of materials, processes and subjects in D&T (Curriculum Development Institute, 1996), changes were largely negligible – that is up until after the Handover to China in 1997.

**Rhetoric and Reality - After the Handover**

In his first *Policy Address* as Chief Executive of the Hong Kong Special Administrative Region, Mr. Tung Chee-hwa outlined several initiatives, including an increased emphasis on language skills and a Quality Education Fund (QEF) to encourage innovation and self-

motivated reform in primary and secondary schools (Tung, 1997). For Design & Technology programs, these initiatives were to have different impacts. Language policy insisted on mother tongue instruction in all except for those in 100 secondary schools allowed to continue teaching in English. For D&T in English-medium schools, instruction regularly did not follow this policy, as the difficulty explaining technical terms and the limited language skills of D&T teachers resulted in mixed code teaching. The QEF turned out to be successful for only a few D&T programs, with computer hardware and software for CAD the most common award from successful proposals submitted by teachers.

The *Policy Address* and subsequent *Learning for Life, Learning Through Life: Reform Proposals for the Education System in Hong Kong* (Education Commission, 2000) also included rhetoric on the need and benefit of information technology as a required feature in schools. As Chief Executive Tung (1997) stated, we need to "equip our teachers with the necessary IT skills; to apply computer-assisted teaching and learning across the curriculum; and to place students in an environment where they can use this technology as part of their daily activities and grow up to use it creatively" (para. 46). Exacerbating the existing situation whereby schools were removing D&T labs in order to place computers, this official call for more IT sanctioned this move. Critical of this fixation with policies that promoted the use of IT, Sweeting (2004) suggested policy makers "supposed that new opportunities created especially by information technology and the 'knowledge-based economy' made earlier experiences in educational policy and practice more or less irrelevant" (p. 526). Bringing proposals such as *Learning for Life* to fruition required the use of public relations techniques for stylish publications and fanfare kickoff press conferences. This "top-down" communication to the citizens of Hong Kong was combined with "an assumption by administrators that information technology could cure most, if not all, problems" (Sweeting, 2004, p. 527).

The *Learning for Life* document also went into great detail as to what the problems and solutions were in order for students to learn more independently. Concern about excessive examinations, monotonous teaching and a lack of creativity in students were cited throughout the document. In broad terms, the Education Commission stated "our priority should be accorded to enabling our students to enjoy learning, enhancing their effectiveness in communication and developing their creativity and sense of commitment" (2000, p. 30). In regard to this challenge, many reform proposals were announced in the document. Two most relevant to technology education were the suggestion for a new S4-S5 subject called Integrated Science and Technology and for a required S6 and S7 subject called Liberal Studies, which would have an optional module on Science, Technology and Social Studies which students could select. Four years later, less than 40 of the more than 450 secondary schools have introduced Integrated Science and Technology. Liberal Studies is still being debated.

**Positive Developments Regarding Technology Education**

Perhaps the single most important document in recent years with the potential to influence technology education was the release of the *Learning to Learn* (Curriculum Development Council, 2000) document that specifically identified eight Key Learning Areas for all students to study. Included was a Technology Education Key Learning Area (TEKLA) that was required for all primary and lower secondary grade students. The TEKLA broadly defined "technology" as "the purposeful application of knowledge, skills and experience in using resources to create products or systems to meet human needs" (p. 2). Yet, in describing how this was to be accomplished in primary or secondary grades, the document fell short in specifics. The accompanying *Technology Education Key Learning Area Curriculum Guide* (Curriculum Development Council, 2002) was also lacking in

detail. Rife with rhetoric about technology being "an influential factor in the social and economic development of our [Hong Kong] society", the TEKLA was seen as being "essential…to the improvement of everyday living, and the social and economic development" (p. 5). With materials and structures, operations and manufacturing, and systems and control identified as three of the six learning elements of technology education, it seemed apparent the subject of D&T would naturally play an important role in having students meet the goals outlined in the TEKLA. However, in a typical fashion of placating individual schools and the public, the *Guide* softened its stance by insisting, "schools could choose to offer different TE subjects (i.e., D&T, Computers, Home Economics, Business Studies, etc) based on factors such as the mission and background of the school and the learning needs of the students" (p. 43). In this way, status-quo was protected and computer-centered subjects would suffice for being technology education.

In contrast, the public strongly supported the broad study of technology in schools. In a recent telephone survey conducted with over 750 randomly-selected adults, more than two-thirds agreed with Curriculum Development Council's more-encompassing definition of technology and that it should be included in the school curriculum (Volk, 2004). The results from questions asked about technology pointed out the public's own limited knowledge and misconceptions - further illustrating the need for technology education in schools. For example, when asked if they could explain how a flashlight works, 70 percent of the respondents said "No". When asked whether a microwave oven heats food from the outside to the inside, 55 percent answered "Yes".

Despite the rhetoric about technology education and the valuable experiences students can have, the sad reality is that very few schools actually implement the subject in a meaningful and sustained way. Primary schools may bury the content in the amorphous

subject called General Studies, which would then share part of the 12-15 percent suggested time allocated along with Science and Personal, Social and Humanities Education. With limited resources, time and teacher training, most primary students receive just a cursory treatment of Technology education.

In secondary schools, D&T remains marginal. Although some improvements have made the subject more "legitimate". The first Pupils' Attitudes Toward Technology study (Volk and Yip, 1999) conducted in 1997 on over 3,500 Secondary 3 students showed significant differences between boys' and girls' attitudes toward technology. Following the PATT-HK study, the Equal Opportunities Commission reminded schools that the Sex Discrimination Ordinance made it unlawful to discriminate against a student in the way it affords him/her access to any benefits, facilities or services. Slowly, schools began to have girls participate in D&T, as well as boys in Home Economics. This action went a long way in starting to reduce gender stereotypes and making D&T a legitimate subject for all students.

After a few years of this new arrangement and opportunity for girls, the Pupils' Attitudes Toward Technology study was repeated (Volk, Yip and Lo, 2003). This time, some of the significant differences in attitudes between boys and girls had disappeared. Table 2 shows the changes from the 1997 PATT-HK and 2003 PATT2-HK studies.

**Table II**
*T-test on Student Characteristics*

| Characteristics | Interest in Technology | Role Pattern | Technology is Difficult | Consequences of Technology | School Curriculum | Career Aspiration |
|---|---|---|---|---|---|---|
| **1997 PATT-HK** | | | | | | |
| Boy (1882) | 2.45 | 2.62 | 2.73 | 2.36 | 2.56 | 2.55 |
| Girl (1477) | 2.74 | 2.59 | 2.77 | 2.44 | 2.72 | 2.74 |
| Significance | ** | ** | ** | ** | ** | ** |
| **2003 PATT2-HK** | | | | | | |
| Boy (1502) | 2.57 | 2.72 | 2.81 | 2.43 | 2.51 | 2.62 |
| Girl (1374) | 2.80 | 2.69 | 2.81 | 2.49 | 2.61 | 2.77 |
| Significance | ** | | | ** | ** | ** |

While it is possible to assume changes in society during this time and/or other outside factors influenced this change, the new study seemed to indicate D&T was actually playing a role in promoting students' positive attitudes toward technology. The impact of these changes on students' future education and career goals is obvious.

Although the benefits and positive changes seem to be occurring with girls now taking Design & Technology, today only about 60 percent of the lower secondary schools offer the subject. Without all secondary schools providing D&T-type subjects, a form of discrimination still exists, with some students denied educational experiences solely due to a school's prerogative. The time appropriated for those schools with D&T has also been reduced, since the addition of girls into the programs doubled the number of students a teacher must see, but now in one-half the time. The TEKLA Curriculum Guide (Curriculum Development Council, 2002) recommended between 8-15 percent of total time allocated to TE. Yet, a report on how schools were actually implementing the reform found that for TE subjects in lower secondary grades (of which computers is contained), showed that the lesson time ranged from 5.1 to 10.0 percent of the total time, with 8.3 being average (Education and Manpower Bureau, 2004).

Even with school administrators' continued assumption that "computers" are the same as "technology education", with over 95 percent of secondary students now having computers at home, one could argue schools' continued emphasis on basic computer skills and applications may not be as relevant, necessary or appealing to students. Finally, the interest in the subject as a Certificate in Education exam has also declined by 15 percent from 1997 to 2003 (Examination and Assessment Authority, 2004), placing pressure on the continuation of the subject at that level.

**The Future**

Although there have been many position papers and policy statements over the years about the need for Hong Kong students to study and experience technology, perhaps the current Key Learning Area reform effort has the greatest potential for actually realizing this goal. Proposals being discussed for further changes in the secondary school structure such as reducing the current seven years of school to six, and reducing the emphasis on examinations will also necessitate a review of the total school curriculum, with perhaps many schools needing to change (Curriculum Development Institute, 2004). However, how this will actually affect technology education remains uncertain.

To reach the goals and recommendations set forth in the Technology Education KLA, Hong Kong's primary schools must encourage more subject integration and eliminate restrictions placed on learning through set time-on-task scheduling. This obviously challenges the current practice of having subject specialist teachers in primary grades and scheduling subjects to standard bell schedules. Teachers that can weave examples of technology into maths, science, history and languages will be much more successful at providing authentic, creative and meaningful learning experiences for their students. This

would suggest that pre-service teacher must have technology education as part of their professional preparation.

For all lower secondary schools, they should have facilities and programs in Design & Technology in order for all students to have opportunities and experiences. In fact, with the "millennium school design" now standard for all new secondary schools, one large 325 square meter D&T workshop is still included (Education and Manpower Branch, 1997), although quite often, the space is left unequipped other than as a common office area for staff. Lower secondary students in schools with D&T could progress from somewhat structured technology and design activities in order to become familiar with tools, materials and processes, followed by problems that are more open-ended and challenging.

The scheduling for Design & Technology (as well as other cultural subjects) will also need to be re-examined, as the current practice is for students to take such subjects once every 6 day-cycle for 90 minutes. This scheduling for administrative convenience is at the expense of consistency, continuity and maintaining student enthusiasm. A better arrangement would be in a concentrated block of time, over several weeks so that students could rotate from one cultural subject to the next. This would help reduce problems associated with students having to focus attention on too many subjects and would greatly simplify teachers' lives. Attention also needs to be paid to the recommended time suggested for TE subjects and that schools should be held accountable that the time, content and activities suggested in the *TEKLA Curriculum Guide* are followed (Curriculum Development Council, 2002).

In senior secondary grades, the proposed new Liberal Studies core subject may appear to be a step in the right direction. In this subject, there are three areas of study: Self & Personal Development; Society & Culture, and Science; Technology and the Environment.

Within the latter area, there are three compulsory parts, Diseases and Health; Information Technology & Society; and Pollution & the Environment. Students then select two out of a four electives on Biotechnology, Space Exploration, Transportation, and Energy. However, the lack of schools that actually have quality D&T-type facilities and the limited number of trained teachers make it doubtful students will be able participate in anything more than superficial lectures and discussions about technology. Furthermore, without all students having prior hands-on technology education experiences in lower secondary grades, most "independent learning" about technology in Liberal Studies will likely result in outcomes that are paper reports accompanied by PowerPoint presentations.

Finally, a feature of the new senior secondary curriculum beyond the core curriculum of Chinese, English, Mathematics and Liberal Studies, will have students select two to three electives from approximately 20 subjects (Curriculum Development Institute, 2004). Subjects include among others, Chemistry, Biology, Physics, Music, Physical Education, and a new subject called Design and Applied Technology (DAT). This new subject will combine features of subjects such as Graphical Communications, D&T (S4-5), and electronics, resulting in their elimination. The rhetoric and rationale for DAT is typical, suggesting it will "significantly enhance the competitiveness of our products and services", as well as " help... build Hong Kong into a centre for design and creative industries" (p. 244). However grand the intentions of this subject are, they must again meet the reality of school practice. There is no requirement for schools to offer each elective, and even if the elective is offered, with more academically-attractive options available such as mathematics and science, there is little to assume DAT will be selected by students or suggested by their parents.

## Conclusion

Given past rhetoric and limited practices, existing economic and administrative constraints, coupled with the skewed perception by many schools of what constitutes technology, the reality is technology education subjects such as Design & Technology will most likely remain marginal in schools. Nevertheless, the growth and development of technology in Hong Kong will continue to impact all students' lives, and the current rhetoric about the importance of all students learning about technology will remain just that.

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