Hong Kong Pupils' Attitudes Toward Technology: The Impact of Design and Technology Programs

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As a subject in Hong Kong secondary schools, Design & Technology (D&T) is influenced by four factors. First, for many years, the subject of Design & Technology was offered almost exclusively to boys, with girls only being allowed to take Home Economics. Recently however, girls are now having the opportunity to take D&T as a required subject in schools. Second, although some schools have allowed girls to take D&T for several years, some have only just started this practice. As a result, some girls have studied D&T from secondary one to three, while others may only be having their initial experience as a secondary three student. Third, the content and teaching of D&T varies from school to school, and depends on the type of syllabus followed and facilities available. Fourth, not all secondary schools in Hong Kong offer D&T, meaning a large number of both boys and girls have never experienced the subject.

To examine Hong Kong pupils' attitudes toward technology, a Pupils' Attitudes Toward Technology (PATT2-HK) study was conducted with over 2,800 students in 22 secondary schools. This study duplicated the first PATT-HK research conducted earlier (Volk & Yip, 1999), and the findings were compared. More specifically, given the immense changes that occurred in just a few short years relating to D&T program availability, facilities, and subject content, this study was undertaken to determine whether or not the proactive measures to ensure that all students have the opportunity to participate in D&T were in fact having a positive impact on pupils' attitudes toward technology. From this PATT2-HK study and examination made of current factors, recommendations as to the impact and future direction of D&T in Hong Kong are made.

Attitudes, Education, and Technology

Attitudes can be considered both the determinants and consequences of learning experiences (Davies and Brember, 2001). Learning experience may be influenced by factors such as self-concept, parents, teachers, environment, socio-economic status, objects, and situations (Coon, 1995; Weiner, 1994).

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Although these experiences may be satisfying or frustrating, attitudes are nevertheless developed, and once established, they enable or inhibit further learning opportunities. As an example, Taplin and Jegede's (2001) study of gender differences in Hong Kong students noted that students' attitudes could be used to predict achievement. They used students' level of confidence in a subject as one important attitudinal variable. Educators have identified strategies found to enhance female students' confidence and success in a subject. These include changing learning materials, encouraging group activities, and reducing uncomfortable situations (Brinkworth, 1999; Nemeth, 1999; Taplin and Jegede, 2001).

Technology impacts students' daily lives and certainly plays an important part in developing students' positive and negative attitudes toward it. As a direct means, technology may help develop attitudes through students' experience with cars, computers, or even when they attempted to ride a bicycle for the first time. Vicariously, technology may form attitudes through less obvious means such as mass media and advertising campaigns.

Translated into their adult lives, students' attitudes and associated learning experiences impact future careers. Relating to the Hong Kong context, Mak and Chung's (1997) examination of education and employment of women pointed out the differences between men and women's careers and salaries, despite perceived gains in educational opportunities. They noted that attitudes formed by women themselves and through outside society tend to reinforce factors which limit a woman's participation in non-traditional (technical) careers. Choi (1995) raised concerns that the structure and content of Hong Kong's education system worked "to reflect and uphold gender inequality in the wider society" (p. 127). In this regard, the formal and informal curricula, gender barriers to fields of science and technical studies, and gender bias in textbooks were seen as contributing factors to gender role acceptance and the perpetuation of the perceived "natural" differences between genders. Obviously, such critiques about education, attitudes, and employment apply to many other nations and cultures, and are not unique to Hong Kong.

Design & Technology in Hong Kong

Reflecting Hong Kong's colonial past, the subject of Design & Technology was influenced by the British system. Born out of the traditional subjects of woodworking and metalworking in the late 1970s, D&T was an attempt to move beyond the craft-based and skill-oriented programs that permeated most school programs. Unfortunately, the subject continued to suffer from a dated syllabus and approach, outdated facilities, and a poor public perception. It also reflected gender discrimination and stereotyping, with only boys taking the subject (EOC, 1999; Hong Kong Human Rights Monitor, 1999). Recently however, that practice has started to change.

In November 1997, the first Hong Kong Pupils' Attitudes Toward Technology study began. Although at that time only one school out of the 18 that participated in the study allowed girls to take D&T, the data indicated that some of the attitudinal differences between boys and girls disappeared when such opportunity exists. Referring to Hong Kong's Sex Discrimination Ordinance that it is unlawful to discriminate against a student in the way it affords him/her access to any benefits, facilities, or services, the results (Volk & Yip, 1997) were sent to the Equal Opportunities Commission (EOC), with the suggestion that they look into the matter.

In early 1999, the Equal Opportunities Commission published their own findings, looking at D&T and Home Economics subject availability and opportunities (EOC, 1999). Their conclusion and subsequent recommendations supported the earlier charge that D&T should be available to all students, regardless of gender. In consultation with the Education Department, a few secondary schools immediately began to allow girls to take D&T that academic year.

It has now been three years since girls have had the opportunity to take D&T, with some schools having to phase in the opportunity due to continued scheduling and/or staffing difficulties. In the 2001-2002 academic year, all schools offering D&T now allow girls to participate. The result is that one group of girls has had D&T for three years, while others have just been introduced to the subject in their third year of secondary schooling.

While it could be considered a big achievement that girls now have the opportunity to take D&T, not all schools offer the subject. This deprives both boys and girls of the experience. According to the Education Department statistics (ED, 2002), 298 of the 488 secondary schools (61%) offer D&T, with most schools only offering the subject up to secondary three (S3) level. Secondary three students would typically be 14-15 years of age. Certificate of Education Examinations at S5 (ages 16-17) and Advanced Level Examinations at S7 (ages 18-19) were only offered in 37 and 4 schools, respectively. In fact, only 551 students in Hong Kong sat for the D&T Certificate of Education Examination in 2002 compared with 17,890 for the subject of Computer Studies and 21,879 for Accounting.

The teaching of Design & Technology is not consistent among schools that offer the subject. As most schools teach up to secondary three, there is no public examination and teachers have relative freedom to follow either the older 1983 syllabus (Curriculum Development Committee, 1983) or the new syllabus introduced in 2000 (Curriculum Development Council, 2000). Factors that influence the type of D&T program are the experience of the teacher and type of equipment contained in the labs. For instance, the standard equipment list for the older syllabus included such items as metalworking lathes and foundry areas, but in practice, these can most often be found covered in plastic sheets and an accumulation of dust because of disuse. Even if a teacher wanted to switch to the new syllabus, limits in existing equipment and budgets may preclude program change. One avenue used by some teachers to improve their facilities has been the awarding of grants through the government-initiated Quality Education Fund. Most notably in this regard has been the purchase of equipment for CAD, CAM, and robotics.

Recently, the Education and Manpower Bureau proposed that all subjects be re-organized and categorized into Key Learning Areas (KLAs), with Technology Education being one of the KLAs (Curriculum Development Council, 2002). Technology Education, as it is broadly defined as a KLA, includes Computer Applications, Home Economics, Business Studies, and Technological Subjects. Within the category of Technological Subjects, D&T is the most common in lower secondary schools, although some schools may offer Graphical Communications, Technology Fundamentals, Design Fundamentals, and/or Electronics and Electricity. Although appearing to be a positive step in requiring D&T subject matter to be included in all schools, including primary schools, it remains to be seen how much of the content of this KLA will be met given the lack of D&T teachers and facilities in such a large number of schools.

Methodology

Following the methodology and instrument used in the previous PATT-HK study, the attitudes of secondary three students toward technology were again examined. First, a list of all secondary schools offering D&T was obtained from the Education Department. This list indicated whether boys and girls were studying the subject for three years or whether girls were just beginning to experience D&T for the first time in secondary three. Using a proportionate sampling technique (Bordens and Abbott, 2002), schools were placed into one of two categories, based on the students' ability to participate in the D&T program. With a population of approximately 85,000 secondary three students, the sample size required to be within a sampling error of ±.03 with a 95% level of confidence was found to be 1,077 (Mitchell and Jolley, 2000). Estimating an approximate number of students in a typical secondary school and using the list of schools compiled for each of the two categories, every fifth school was systematically selected (Crawshaw and Chambers, 2001) and sent a consent letter and sample instrument. From this canvassing, 14 out of 40 schools (35%) having girls just taking D&T for the first time (or about to take D&T that year), and 8 out of 24 (33%) schools that had girls going through three years of D&T agreed to participate. From the number of instruments then requested from participating schools, the sample size was found to be sufficient.

Cooperating teachers were then sent packages of questionnaires, directions to administer the questionnaire, and a short form asking about their program and students. From this more thorough background information obtained, it was found that some of the schools had girls taking D&T for only two years. These schools were then included in the total, but not when examining students with either one or three years of experience.

Follow-up telephone interviews and site visits were also conducted to classify the D&T program in the school as being either "Traditional" or "Innovative." Traditional programs were those that generally maintained craft-based activities, focused on skill development, and followed the old 1983 D&T syllabus. Innovative programs generally included more problem-solving and group activities, and had acquired equipment necessary to teach topics included in the 2000 D&T syllabus such as robotics, electronics, and control technology.

The PATT2-HK questionnaire was the same as the PATT-HK questionnaire, which was based on the earlier work of Bame, Dugger, de Vries, and McBee (1993). PATT2-HK consisted of three sections. The first section asked students to provide a short description of what technology is. The second section requested information required for demographic data analysis. The third section contained 58 statements to assess respondents' attitudes toward technology. A five-part Likert scale, with "strongly agree" to "strongly disagree" was used for student responses. The attitude statements were broadly organized under the following six categories:

1. Interest in technology (Interest)
2. Technology as an activity for both boys and girls (Role Pattern)
3. Perception of the difficulty of technology (Difficulty)
4. Consequences of technology (Consequence)
5. Technology in the school curriculum (Curriculum)
6. Ideas about pursuing a career related to technology (Career Aspiration)

The data obtained from the PATT2-HK instrument were used to examine the following questions:

1. Are there changes in demographics since the 1997 PATT-HK study?
2. What current differences exist between boys' and girls' attitudes toward technology?
3. Are there differences in girls' attitudes for those who participated in D&T for three years, compared with girls with no experience or just starting?
4. Are there differences in students' attitudes from programs that are generally classified as "Traditional" or "Innovative"?

Data were analyzed following similar procedures as in PATT-HK, and descriptive statistics, t test, and two-way analysis of variance (ANOVA) were used. Descriptive statistics were used to examine data related to demographics and were generally reported as percentages. To compare independent population means for characteristics such as gender and the number of years studying D&T, *t* tests were used. To assess the effects of two different treatments, such as the independent variables of gender and having a personal computer, a two-way ANOVA was performed (Kanji, 1999; Peck, Olsen and Devore, 2001).

Results

Demographics and Technological Climate in the Home

A total of 2,876 usable surveys were returned in the PATT2-HK study, with 52.2% of the respondents being boys and 47.8% girls. This proportion corresponds closely to the 2001 Population Census with 51.5% in the 10-15 age group boys and 48.5% girls (Hong Kong SAR Government, 2001). The gender

Table 1
Cross Comparisons of Gender with Student Characteristics and Home Environment

	1997 (in %)		2002 (in %)	
	Boys	**Girls**	**Boys**	**Girls**
Extent father's job has to do with technology (n)	(1,817)	(1,444)	(1,465)	(1,348)
very little	30.5	33.8	41.0	48.7
Little	37.4	38.8	38.6	36.6
Much	25.0	21.3	15.4	10.8
very much	7.1	6.2	5.0	3.8
Extent mother's job has to do with technology (n)	(1,785)	(1,399)	(1,426)	(1,311)
very little	59.6	62.1	64.4	69.7
Little	25.8	22.7	24.5	20.6
Much	11.4	12.2	8.0	7.6
very much	3.2	3.0	3.1	2.1
Do you have Lego or technical toys at home? (n)	(1,847)	(1,460)	(1,479)	(1,361)
Yes	64.6	60.2	59.2	44.8
No	35.4	39.8	40.8	55.2
Do you have a working space for modelling at home? (n)	(1,857)	(1,464)	(1,473)	(1,352)
Yes	27.0	11.2	24.0	9.0
No	73.0	88.8	76.0	91.0
Is there a personal computer in your home? (n)	(1,863)	(1,471)	(1,473)	(1,361)
Yes	54.5	45.7	89.3	87.1
No	45.5	54.3	10.7	12.9
Do you think you will choose a technological profession? (n)	(1,860)	(1,471)	(1,465)	(1,347)
Yes	65.0	47.2	66.5	54.1
No	35.0	52.8	33.5	45.9
Are you a beginner taking Design & Technology or any technical subject in school? (question relevant for girls only) (n)				(1,127)
Just started or will start (One Year)				33.6
Have studied nearly 3 years (Three Years)				66.4

distribution in 2002 was more precise than in 1997, as girls generally did not take D&T and the cooperation of Home Economics classes was required. Table 1 shows the results of the information gathered on the technological climate in the home. For the majority of students, the father's job had little or very little to do with technology. When students were asked about their mother's occupation, a higher percentage indicated that their mother's job had little or very little to do with technology. In general, there appears to be a reduction in occupations relating to technology, having technical toys, and working space for modeling at home since the earlier PATT-HK study.

The availability of personal computers at home greatly increased, with 50% having a computer in 1997 to nearly 88% in 2002. Also, although the percentage of boys indicating an interest in a technological profession remained nearly the same, girls appeared to have a greater interest than in 1997. The number of girls interested in a technology career increased from 47.2% to 54.1%. This increased interest by girls was encouraging, although the interest was still less than boys.

t Tests on Student Characteristics

t Tests were conducted on the six student characteristics and the six attitude categories of "Interest," "Role Pattern," "Difficulties," "Consequence," "Curriculum," and "Career Aspiration." The results are presented in Table 2. The numbers in each category present the mean response, with a lower number indicating a more-positive attitude.

When the characteristic of "Gender" was examined in the earlier PATT-HK study, there were significant differences in all six attitude categories, with boys having significantly more positive attitudes than girls in the categories of "Interest," "Role Pattern," "Difficulties," "Consequence," "Curriculum," and "Career Aspiration." Girls had more positive attitudes about "Role Pattern." However, in 2002 the significant differences in the "Role Pattern" and "Difficulties" categories were now non-existent.

It was also interesting to observe that overall, there was a decline in students' positive attitudes toward technology from 1997 to 2002. This lack of interest for both boys and girls in all categories may reflect the general economic malaise that Hong Kong has witnessed since 1997. It may also reflect a lack of confidence in their future options. For example, according to the Hong Kong University Public Opinion Programme (2002), confidence in Hong Kong's future fell from 77.5% right after the Handover in 1997 to 52.5% at the time the survey was conducted. The unemployment rate also increased during this time, going from 2.1% to 7.4% (Hong Kong SAR Government, 2002).

The impact of having technical toys, a working space at home and/or a personal computer can be seen in several of the categories. Students' "Interest" attitudes toward the "School Curriculum" and "Career Aspiration" seem most affected. As expected, those who would choose a profession related to technology had more positive attitudes in all categories.

Table 2
t Tests on Student Characteristics

Characteristics	**Interest in Technology**	**Role Pattern**	**Technology is Difficult**	**Consequences of Technology**	**School Curriculum**	**Career Aspiration**
Gender						
Boys (1,502)	2.57	2.72	2.81	2.43	2.51	2.62
Girls (1,374)	2.80	2.69	2.81	2.49	2.61	2.77
Significance	**			**	**	**
Technical toys						
Yes (1,486)	2.60	2.68	2.80	2.42	2.51	2.63
No (1,354)	2.78	2.74	2.82	2.49	2.62	2.77
Significance	**	**		**	**	**
Working space at home						
Yes (476)	2.52	2.68	2.79	2.42	2.47	2.60
No (2,349)	2.71	2.71	2.81	2.46	2.58	2.72
Significance	**				**	**
Personal computer						
Yes (2,502)	2.66	2.70	2.80	2.43	2.54	2.67
No (332)	2.82	2.78	2.85	2.61	2.68	2.83
Significance	**	**	**	**	**	**
Choose tech. profession						
Yes (1,703)	2.54	2.67	2.78	2.38	2.45	2.49
No (1,109)	2.89	2.76	2.84	2.57	2.73	3.00
Significance	**	**	**	**	**	**
Girls who have taken D&T or technical subject in school						
One Year (378)	2.79	2.73	2.83	2.55	2.64	2.71
Three Years (745)	2.82	2.67	2.80	2.46	2.60	2.80
Significance				**		**

** $p <= 0.01$

Given the recent opportunities for girls to now take D&T and the varying degree of their being able to participate depending on school—from three years (Three Years) to their first introduction (One Year), several significant differences were observed. Girls who had D&T for three years had more positive attitudes toward the "Consequences of Technology," while girls with little or no experience in D&T had more positive attitudes in the category of "Career Aspiration."

Table 3
Two-way Analysis of Variance on Gender Differences

Characteristics	**Interest in Technology**	**Role Pattern**	**Technology is Difficult**	**Consequences of Technology**	**School Curriculum**	**Career Aspiration**
Technical toys	**	**		**	**	**
Gender	**	**		**	**	**
2-Way Interactions	+				**	
Working space at home	**				**	**
Gender	**	**		**	**	**
2-Way Interactions	+				+	
Personal computer	**	**	**	**	**	**
Gender	**	**		**	**	**
2-Way Interactions	**			**	**	**
Choose tech. profession	**	**	**	**	**	**
Gender	**	**			**	**
2-Way Interactions	+	+				

** $p <= .01$
+ interaction found in the earlier PATT-HK study

Two-way Analysis of Variance Examining Gender Differences

To explore the interaction between boys' and girls' attitudes toward technology and each demographic characteristic, a two-way Analysis of Variance (ANOVA) was performed. Although in 1997 five distinct interactions were found for several of the characteristics, having a personal computer was not one of them. However, in the PATT2-HK results, only having a personal computer produced an interaction. Table 3 provides the results of this analysis.

t Tests on Gender and Type of D&T Program

To examine attitudinal differences due to the type of program students were exposed to, *t* tests were conducted on the student characteristics of "Gender," "Personal Computer," and number of years girls have "Taken D&T." Programs were classified into two broad categories—Traditional (T) or Innovative (I), based on characteristics such as activities conducted, syllabus followed, and facilities. The results are presented in Table 4.

For "Traditional" programs, there was no significant difference between boys' and girls' attitudes in the category of "Consequences," although "Innovative" programs still produced significance. This finding was different when the data were analyzed in aggregate (see Table 2).

Having or not having a personal computer appeared to produce significant differences in several categories among students in "Innovative" programs. This may suggest that "Traditional" programs that included more craft-based projects as opposed to "Innovative" programs with activities such as robotics and CAD were more comfortable for students with little interest or access to computer technology.

When girls having three years of D&T were compared with those having only one year, several differences were noted. For the categories of attitudes toward "Role Pattern," "Difficulty," "Consequences," and the "School Curriculum," girls beginning D&T had significantly less-positive attitudes toward technology in programs classified as being "Innovative." This feature was reversed for "Career Aspiration," with first year girls in "Traditional" programs having significantly more-positive attitudes than those with three years of experience in a similar program.

Summary of Results

The major results of the second study on Hong Kong Pupils' Attitudes Toward Technology can be summarized as follows:

1. Changes in demographics since the 1997 PATT-HK study indicated that fewer parents had occupations involving technology, more students had computers, and girls now had a greater interest than in the past to pursue a career in technology. This last characteristic was still less than boys, but somewhat encouraging to observe.
2. Regarding differences in attitudes toward technology between boys and girls, there were still significant differences in four of the categories, but for the categories of "Role Pattern" and "Difficulty," the differences had disappeared since the original PATT-HK study.
3. There were two significant differences found between girls' attitudes for those that participated in D&T for three years, compared with girls with no experience or just starting. Girls with three years of D&T had more positive attitudes toward the "Consequences of Technology,"

while those with one or fewer years of D&T had more positive attitudes relating to "Careers."

4. Girls in programs generally classified as "Innovative" had less-positive attitudes in several categories of technology when they were just beginning their studies in D&T. But after three years, their attitudes became significantly more positive. "Traditional" programs only produced significance in the category of "Career Aspiration," with girls being more positive in their first year of study.

Table 4
t-Test on Demographic Characteristics and Program Type

Characteristics	Interest in Technology		Role Pattern		Technology is Difficult		Consequences of Technology		School Curriculum		Career Aspiration	
	T	**I**	**T**	**I**	**T**	**I**	**T**	**I**	**T**	**I**	**T**	**I**
Gender												
Boys (643)/(781)	2.56	2.58	2.70	2.74	2.82	2.79	2.41	2.43	2.51	2.51	2.64	2.62
Girls (652)/(663)	2.79	2.82	2.67	2.71	2.78	2.73	2.47	2.51	2.59	2.63	2.75	2.79
Significance	**	**						**	**	**	**	**
Personal computer												
Yes (1181)/(1253)	2.66	2.66	2.68	2.71	2.80	2.80	2.43	2.44	2.55	2.53	2.69	2.66
No (113)/(201)	2.76	2.88	2.70	2.83	2.83	2.86	2.55	2.64	2.58	2.75	2.77	2.88
Significance		**		**			**	**		**		**
Girls who have taken D&T or technical subject in school												
One Year (172)/(151)	2.73	2.86	2.65	2.81	2.76	2.90	2.49	2.67	2.54	2.76	2.65	2.77
Three Years (398)/(347)	2.80	2.84	2.67	2.67	2.79	2.81	2.46	2.47	2.62	2.58	2.79	2.80
Significance				**		**		**		**	**	

**$p <= 0.01$
T = Traditional Program, I = Innovative Program

Implications

The results of PATT2-HK suggest that D&T programs are beginning to have a positive impact on students' attitudes. This can be illustrated by the changes in girls' attitudes depending on the length of exposure and type of program. Girls appear to have more positive attitudes toward the "Consequences" of technology the more years they are in D&T. This suggests that girls may be developing an awareness of the relationships and impacts of technology through the topics, activities, and time spent in such programs. However, their having less-positive attitudes toward "Careers" the more they are in D&T may suggest a lack of confidence in their ability to succeed or a lack of enjoyment of the activities contained in the D&T program.

The significant changes in attitudes in several of the categories by girls who participated in three years of an "Innovative" program may suggest that innovative programs are having more of an effect on students' attitudes and thus produce a more powerful learning experience than a more traditional approach. As noted earlier, teaching strategies that include changing learning materials, encouraging group activities, and reducing uncomfortable situations help enhance female students' confidence and success in a subject. Perhaps such strategies and content more representative of innovative programs are proving to have greater success in affecting attitudinal change.

While there is guarded optimism about recent changes, especially now with the inclusion of girls in the programs, there remains some degree of uncertainty and vulnerability about the future of the subject in Hong Kong schools. As noted by Hamilton and Middleton (2002), the implementation of a subject such as D&T is enhanced by features such as appropriate facilities, support from school administrators, adequate budget, and involvement of teachers. Tragically, this may not be as favourable for improving the position of D&T in Hong Kong. For instance, school principals currently have considerable control over the type of subjects offered in schools, and as D&T is not a required subject, most new secondary schools are not providing any sort of facilities. This will no doubt impact the already low percentage of secondary schools offering the subject. Furthermore, anecdotal evidence indicates that some schools with existing D&T programs have seen their facilities reduced, with general-purpose computer labs being installed in one of the typical two-room D&T laboratory configurations.

Scheduling time for students to attend D&T has also been affected by the inclusion of girls. The new arrangement requiring splitting time between D&T and Home Economics has resulted in a net loss of total time available for D&T teachers to cover material or let students work on projects. With time and scheduling constraints, a D&T teacher may only have approximately one hour of contact time per week with the students. Although all students are now being exposed, this superficial coverage of D&T may not be providing either the student or the program any benefit.

Finally, with the introduction of the Technology Education Key Learning Area as a required component in all grades, including primary, D&T will no doubt undergo scrutiny as to how the subject matches the value, content knowledge, and skills identified in the TEKLA. Obviously, the reputation of D&T and perceptions of its ability to contribute to the TEKLA will play a role in this review. From the findings of this study and the evidence that D&T-type programs which promote creativity, problem-solving, and collaborative skills, are having a positive effect on students' attitudes toward technology, it is imperative that the past poor reputation of the subject be replaced with a new awareness of the value, need, and potential of the subject to contribute to the TEKLA. Educators, parents, and the public need to realize that the activities and content available through D&T programs, especially those incorporating more innovative approaches, can play an important role in how the new TEKLA is formulated. For secondary and primary schools, this suggests that all schools and all students would benefit from an exposure to quality D&T-type activities and programs, and that the TEKLA cannot be limited to just a study of computer applications, which principals erroneously may view as meeting the objectives of technology education. Without the availability of D&T as a part of the TEKLA in all schools, questions about equal opportunity arise. This opportunity to have a learning experience in Design & Technology is for all students, and not just based on gender.

Conclusion

The PATT2-HK study was conducted five years after the original PATT-HK study and after changes were made to Design & Technology programs, such as the inclusion of girls, new facilities, and new content. The changes to D&T were neither uniform nor universal, as all secondary schools do not offer the subject, and all existing programs did not provide girls with the opportunity at the same time. D&T facilities and content are also varied among schools.

Despite these limitations, it appears that the inclusion of girls in Hong Kong D&T programs is having a positive impact on students' attitudes toward technology, with the differences between boys' and girls' attitudes disappearing for some categories. The type of program and resulting learning experience also impact students' attitudes, suggesting that programs that are more innovative and less craft- and skill-based are more successful in influencing attitudes. This should provide evidence to educators and the public as to the educational value of the subject.

Major concerns still exist with the lack of instructional time available for all students, insufficient facilities, and the traditional syllabus remaining in some schools. Perhaps the biggest obstacle to address is that Design & Technology is not recognized as a necessary subject for all students in all schools. Without this acknowledgement or commitment, approximately 40% of boys and girls in Hong Kong secondary schools never have the opportunity to benefit from the experience. Given this uncertainty, it remains to be seen if the program can weather a future based on economic constraints, educational changes, and public indifference to the subject.

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