Educational Research Journal《教育研究學報》, *Vol. 17, No.1, Summer 2002*

School Banding and Creativity of Hong Kong Junior Secondary School Students

Elisabeth Rudowicz
Department of Applied Social Studies
City University of Hong Kong

Anna Hui
Centre for Child Development
Hong Kong Baptist University

The major purpose of this study was to investigate the level of development of creative potential among Hong Kong secondary school students, and to examine the relationship between school banding and students' creativity. Students' creative potential was measured by the Test of Creative Thinking — Drawing Production (TCT-DP). A sample of 2,411 participants aged between 12 – 16 randomly selected from 23 secondary schools took part in the study. Results from this investigation were briefly compared with data obtained from studies in other cultural settings. Hong Kong students aged 12 and 13, irrespective of the school banding, achieved rather lower scores on the TCT-DP as compared

---

This paper is based on a presentation at the Second International Symposium on Child Development, Hong Kong, June 2001.This study was funded by the Strategic Research Grant (No. 700024) of the City University of Hong Kong.

Correspondence concerning this article should be addressed to Elisabeth Rudowicz, Department of Applied Social Studies, City University of Hong Kong, 81 Tat Chee Avenue, Kowloon. E-mail: ssliza@cityu.edu.hk

with German students. However, the TCT-DP scores of students attending schools representing high academic standard (high band) accelerated dramatically for ages 14 and 15. The study also found that students attending medium and low band schools showed no significant development of their creative potential between the ages of 12 and 16. School band proved to be a statistically significant predictor of creative development.

Key words: creativity; secondary school; school banding; Hong Kong

Introduction

Creativity is widely recognised as an ability that is crucial to improving the quality of solutions to problems and challenges faced by individuals and societies. Feldman (1999) conceptualised creativity as involving several dimensions: cognitive processes, social/emotional processes, family aspects, education and preparation, characteristics of the domain and field, social/cultural contextual aspects, and historical forces, events and trends. The development of any person's creative potential is affected by these personal, social, cultural and educational influences. There is no doubt, however, that school education could play a significant role in enhancing creative development.

Over the past three decades, the literature has documented numerous studies regarding the relationship between education and creativity. These studies explored the development of creativity in children at different grade levels both in longitudinal and cross-sectional studies (Camp, 1994; Lau, Cheung, Chan, Wu, & Kwong, 1998; Runco & Charles, 1997; Torrance, 1968; Urban, 1991); enhancement of creativity through structured approaches in formal educational settings (Mansfield, Busse, & Krepelka, 1978; Treffinger, Speedie, & Bruner, 1974); creativity and academic aptitude (Ai, 1999; Haddon & Lytton, 1968; Marjoribanks, 1976); teachers' implicit views on creativity (Chan & Chan, 1999; Runco, Johnson, & Baer, 1993) and their explicit behaviors in the identification of creative students (Lau & Li, 1996).

The developmental studies documented that creativity level, as measured by different creativity tests, increased throughout the school age, although some signs of a slump were also observed. Torrance (1968) in a longitudinal study of 100 North American children using the Torrance Tests of Creative Thinking (TTCT) reported significant "fourth-grade slumps" in scores of fluency, flexibility, originality, and elaboration. A similar trend was observed by Urban (1991) using the Test for Creative Thinking — Drawing Production (TCT-DP). A significant drop in the creativity scores of a German sample occurred in 5- and 6-year old children followed by a significant increase in these children's scores around age of seven or eight. In addition, Lau, Cheung, Chan, Wu, and Kwong (1998) in their study of 1,418 Chinese school children in Hong Kong using the Wallach-Kogan Creativity Tests (Wallach & Kogan, 1965) reported a significant drop in creativity scores between the 6th and 7th grades. In contrast, Camp (1994) reported an increase in scores of the TTCT figural measures of fluency, flexibility and originality from Grade 1 to Grade 6 and then a decline through Grade 12. The TTCT verbal measures of fluency and flexibility also indicated declines between the 6th to 12th grade period.

Irrespective of the ethnicity of a sample or tests employed to measure creativity, the empirical data seem to be very consistent with regard to gender and level of creative development. On the whole, gender does not appear to be an important variable affecting children's responses to creativity tests (Lau et al., 1998; Rudowicz, Lok, & Kitto, 1995; Rudowicz, Cheung, & Hui, 2001; Urban, 1991). Also, Ai's (1999) study indicated that teachers, while rating their students' creativity, linked creativity level with students' academic achievement rather than with their gender.

Creativity researchers are also interested in looking into the relationship between creativity and personal characteristics of an individual. In Csikszentmihalyi's (1999) systems model, intrinsic motivation was identified as an important personal background characteristic affecting an individual's creativity. Collins and Amabile (1999) have quoted studies of Greer and Levine (1991) and Hennessey and Zbikowski (1993) to support

the statement that simply thinking about intrinsic reasons for completing a task might be sufficient enough to boost creativity.

Both teachers and parents are the adults who are significant in the social environment of children. The values they attach to creativity and their views of a creative person and creative behaviour have great influence on children's development of creativity. As Plato observed, "what is honoured in one's country is what will be cultivated". In a study of implicit theories of creativity among teachers and parents in the United States, Runco, Johnson, and Baer (1993) documented that both groups described creative children as active, adventurous, alert, ambitious, artistic, capable, curious, dreamy, energetic, enthusiastic and imaginative. The teachers selected adjectives, which were more of a social or attitudinal nature, namely cheerful, easy-going, emotional, friendly and spontaneous. Parents chose other adjectives, which are of an intellectual nature and personality traits, as enterprising, impulsive, industrious, progressive, resourceful, and self-confident. A similar study among the Hong Kong Chinese parents and teachers showed that they perceived a creative child as being smart, imaginative, innovative, outstanding, energetic, bold, independent, and with good thinking skills. Intellectual and motivational characteristics topped the list (Rudowicz & Hui, 1997). Much less priority was given by the Hong Kong parents and teachers to attitudinal traits. This observation is consistent with the results of Chan and Chan's (1999) study of 204 Hong Kong primary and secondary school teachers. Unlike teachers in the United States, Hong Kong primary and secondary school teachers tend to associate creativity with intellectual functioning, such as high intellectual ability and high verbal ability. In addition, Hong Kong teachers seem to associate creativity with some socially undesirable characteristics such as rebellious, self-centred. This observation, although not reported in the US studies, echoes Lau and Li's (1996) conclusion that teachers are inclined to associate creativity with children's learning ability and behavioural conduct.

Nurturing creativity in children requires the joint effort of all sectors in the community. In Hong Kong there is a growing recognition of the need

for a comprehensive review of the current educational system. *The Education Blueprint for the 21st century* (Education Commission, 2000) points to the development of students' creativity as a major priority for education in Hong Kong. An adequate educational reform requires broad empirical data regarding the strengths and shortcomings of the current system in order to make a fully informed decision about the proposed changes.

This study aimed at collecting empirical data regarding the development of Hong Kong students' creativity across different age groups (12–16 years old) and at investigating the relationship between school banding and students' creativity.

Method

Sampling and Sample Characteristics

Eighty secondary schools subsidized by the Hong Kong Government were randomly selected for this study by the Department of Education. A letter was sent to the principal of each selected school to invite the schools to participate in the study. In response to this invitation 23 schools agreed to participate. These schools were located in different parts of Hong Kong, namely, Hong Kong Island (5 schools), Kowloon (6 schools), and the New Territories (12 schools), and included schools classified by their students' academic abilities as high (6 schools), medium (5 schools), and low (12 schools). The sample over-represented students of "low" schools and under-represented students of "medium" and "high" schools. The principals of the latter schools were very concerned about losing valuable teaching time for testing. Whereas, the principals of "low" schools expressed interest in the study hoping that its outcome would allow them to better understand their students and in turn to improve the effectiveness of their educational endeavour.

The reported study involved 2,411 Form 2 and Form 3 students. All participants were ethnic Chinese and 89 % resided in Hong Kong for more than 11 years. The proportion of boys and girls was well balanced. There

were 1,243 (51.8%) boys, and 1,157 (48.2%) girls in the sample. Data regarding gender were missing for 11 students. Within the boys' group around 56% attended schools labelled "low", 19% "medium", and 25% "high". The respective figures for the girls' group were 66%, 13% and 21%. The age of the sample ranged from 12 –16 years and the mean age was 14.2 (*SD* = .91). Details of demographic characteristics of the sample are presented in Table 1.

Table 1 Demographic Characteristics of the Sample

School	*n*	Gender		Age					Education*	
		Boys	Girls	12	13	14	15	16	Father	Mother
Low	1482	700	772	150	525	533	211	63	2.65	2.54
Medium	384	233	151	39	132	142	48	23	3.11	3.02
High	545	310	234	41	155	232	107	10	3.08	2.90
Total	2411	1243	1157	230	812	907	366	96		

*Levels: 1 = below primary; 2 = primary; 3 = junior secondary; 4 = senior secondary; 5 = post secondary

Measurement and Procedures

A Form A of the Urban & Jellen's (1996) Test of Creative Thinking-Drawing Production (TCT-DP) was employed to measure students' potential for creativity. The test consists of one sheet of A4 paper with a large square frame drawn on it. Five figural fragments are drawn inside and one outside the frame. These fragments can be described as (a) a semi-circle, (b) a point, (c) a large right angle, (d) a curved line, (e) a broken line, and (f) a small open square outside the frame. Participants are given a standard instruction which requires them to continue with this incomplete drawing. The drawing production is evaluated along eleven criteria, namely, Continuation (Cn), Completion (Cm), New Elements (Ne), Connections made with Lines (Cl), Connections that contribute to a Theme (Cth), Boundary-breaking being fragment-dependent (Bfd), Boundary-breaking being fragment-independent (Bfi), Perspective (Pe), Humor (Hu), Unconventionality with four sub-criteria (usa, usb, ucc, and usd), and Speed (Sp). Scores along all but Unconventionality criteria range from 0-6 points. The Unconventionality scores on each criterion could be either 0 or 3 (Urban & Jellen, 1996). The Chinese version of the test scores as reported in the earlier study (Rudowicz,

2001) showed acceptable interrater reliability (r = .76) and internal consistency, with Cronbach's alpha of .73.

The TCT-DP was administered in a group setting of about 35 students per group. The test was administered by a researcher accompanied by a helper. A standardized verbal instruction was given to students in Cantonese. The same instruction was also written in Chinese on the top of a test form. After completing the test students were asked: (a) "How much interest did you have in drawing this picture?"; (b) "How much practice do you have in drawing?"; (c) "If you were to assess your picture what grade would you give it?"; (d) "How much creativity do you think you have?" and requested to rank their responses on a 1-5 scale (1 = low or little, 5 = high or a lot).

Participants also completed a brief demographic questionnaire designed by the authors that asked for information on age, gender, length of Hong Kong residency, parents' educational level, and marks of the past year examinations in major subjects.

Another set of data regarding the students' creativity was collected from teachers. The teachers'evaluation scale was given to them with the following instructions: "Please rate the creativity of each student listed below. Base your ratings on your own observation of a given student's behavior". The ratings were on a 5-point scale, ranging from "not creative at all" (1) to "exceptionally creative" (5).

Results

Development of Creativity

Gender comparison

No statistically significant gender difference was observed between the total scores of boys and girls on the TTC-DP in the entire sample, across different school bands (t low bands = -1.62, df = 1480, $p > .01$; t medium bands = 1.10, df = 382, $p > .01$; t high bands = -.50, df =543, $p > .01$), and across different age groups (t values ranged from t = .945 for 12 years old to

$t = .183$ for 14 years old, $p > .01$). Our results, presented in Table 2, are consistent with those observed for the German sample (Urban, 1996) and for the Hong Kong sample, when the Torrance Test of Creative Thinking (TTCT) was employed to assess creativity of Hong Kong school children (Rudowicz, Lok, & Kitto, 1995; Spinks, Ku-Yu, Shek, & Bacon-Shone, 1995). On the whole, gender does not appear to be an important variable affecting the development of creative potential.

School banding differences

The analysis of variance ANOVA was used to compare mean total scores obtained on the TCT-DP among students from schools classified as "low", "medium", and "high" with regard to students' academic abilities. Results of ANOVA showed a strong effect of the type of school on the total score of creativity test ($F(2, 2359) = 93.53$, $p \leq .000$). The lowest scores were obtained by the students attending "low" band schools and the highest by those attending "high" band schools (Table 2). The Scheffe's test results confirmed that the differences among these three groups were statistically significant ($p \leq .000$ for all comparisons).

Table 2 Creativity Scores by School Banding and Gender

School	*n*	*M*	*SD*	Min.	Max.	Boys		Girls	
						M	*SD*	*M*	*SD*
Low	1482	19.0	10.2	1	53.85	18.55	9.63	19.47	10.68
Medium	384	22.54	10.9	1.1	57.56	23.13	11.26	21.8	10.48
High	545	26.0	11.0	3.23	58.15	25.75	11.27	26.23	10.55
Total	2411	22.5	10.9	1	58.15				

The relationship between the school banding and the students' self-ratings with regard to the four questions was addressed by performing a multivariate analysis of variance (MANOVA). The MANOVA was employed as this procedure allows for the examination of multiple independent variables on multiple dependent variables without inflating the possibility of a Type 1 error. Furthermore MANOVA accounts for correlations within the dependent variables, thereby, presenting a more accurate picture of the data (George & Mallery, 1999). Interest in the test task, frequency of draw-

ing practice, self-assessed creativity, and the predicted performance on the test were the dependant variables and high/ medium/low school banding was the independent variable. Table 3 lists descriptive statistics related to the self-ratings by school band. Table 4 presents results of MANOVA.

Table 3 Interest in Drawing, Drawing Practice, Perceived Performance on the Test, Self-assessed Creativity, and Teacher's Rating of Students' Creativity by School Banding

School	Interest	Practice	Perceived score	Self-assessed	Teacher ratings	
	M	*M*	*M*	*M*	*M*	*n*
Low (*n* = 1147)	2.73	2.45	2.67	2.75	2.92	527
SD	1.1	1.1	1.0	1.2	.92	
Medium(n = 340)	2.69	2.35	2.65	2.84	2.53	173
SD	1.2	1.1	1.1	1.2	1.2	
High (*n* = 527)	2.90	2.38	2.62	2.83	2.80	408
SD	1.1	1.1	.99	1.1	1.0	

Table 4 MANOVA Summary Statistics of the Effect of School Banding on the Four Self-Ratings

Dependent variables	*df*	*F*	*p*
Interest in the task	2	6.32	.002
Drawing practice	2	.83	.437
Self-assessment	2	1.65	.192
Predicted performance	2	.12	.888

Results of MANOVA revealed that the interaction between school banding and interest in the test task was statistically significant ($F(2, 2209) = 6.32, p = .002$) by the Wilks' lambda criterion (Wilks' λ .99, $p = .001$). The MANOVA did not yield a statistically significant effect of school banding on frequency of drawing practice, self-assessed creativity, and the predicted performance on the test.

To further analyse the effect of school banding on the level of performance on the TCT-DP, regression analysis was carried out with school banding, interest in the test task, and self-assessed creativity as the independent variables and performance on the creativity test as a criterion variable. The other variables that were controlled in the model included gender, frequency of drawing practice, and predicted performance on the test. School banding proved to be a significant predictor of creativity scores (Beta = .251), fol-

lowed by interest in drawing a picture (Beta = .212), and self-assessed creativity (Beta = .105). These three variables explained 16.2 % of variance in the sample (Table 5).

Table 5 Summary of Regression Analysis of Factors Contributing to the TCT-DP Scores

Predictors		Beta	*r*
School band		.251*	.265
Interest in test		.212*	.302
Self-assessed creativity		.105*	.230
	R^2	.162	
	F	136.24	
Frequency of practice		.040	.140
Perceived performance		.038	.201
Gender		.034	-.00
Total	R^2	.171	
	F	57.96	

* $p < .000$.

To find out if the differences observed in the level of development of creativity among students from the "low", "medium" and "high" schools apply across age groups, further comparisons were carried out by performing a two-way analysis of variance (ANOVA). A 4 x 3 factorial design with school banding as one variable and age group as the other was used. The analysis was limited to the age groups 12-15 as creativity scores in the sample seem to stabilize around the age of 15. No significant difference in creativity scores was observed between the age 15 and 16 ($t = 1.51$, $df = 407$, $p = .132$). Table 6 displays descriptive statistics related to the creativity score by age and school banding.

Table 6 Creativity Scores by Age and Populations

Age	12		13		14		15		16	
Mean	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low	17.2	8.9	19.0	10.5	19.7	10.2	18.9	10.5	17.9	9.7
	n =120		*n* = 469		*n* = 470		*n* = 185		*n* = 51	
Med	22.5	10.7	23.2	11.1	22.3	10.6	22.2	11.5	21.5	11.6
	n = 27		*n* = 112		*n* = 129		*n* = 45		*n* = 20	
High	19.7	10.1	24.7	10.6	27.1	10.8	27.9	11.1	27.5	14.2
	n = 39		*n* = 155		*n* = 226		*n* = 99		*n* = 9	
German	28.5	8.9	28.3	9.4	25.8	8.7	26.5	10.1	28.3*	7.7*

* Score on the Form B of the TCT-DP

The results of the two-way ANOVA and application of Scheffe's test confirmed our finding discussed earlier that there were statistically significant differences among students of different school bands, with students from high band achieving higher scores on creativity test than the students of lower and medium band ($F(2, 2156) = 31.81, p = .000$). A statistically significant effect of age group on creativity scores was also observed ($F(3, 2156) = 3.6, p = .01$). A combined effect of school banding and age group on creativity scores proved to be statistically significant ($F(6, 2156) = 2.29, p = .03$). Examination of mean creativity scores across banding and age group indicates a general trend that the lower bands students achieve lower creativity scores across all age groups.

Evaluation of Students' Creativity by Teachers

Gender comparison

Teachers perceived girls as more creative than boys. The difference measured by the independent samples t test was statistically significant for the entire sample as well as for the "medium" and "high" band schools $p \leq .01$ (Table 7). The observed difference in teachers' perception of girls and boys creativity may be attributed to the fact that Chinese teachers tend to associate creativity with intellectual functioning and are over-concerned with students'academic performance (Chan & Chan, 1999). The academic performance of girls in the sample, measured by a composite score for English, Chinese, Maths, Science, History, Chinese History, and Geography as well as by the three major subjects English, Chinese, and Math, was statistically significantly higher than the boys. The respective t tests were (t =2.72,

Table 7 Teachers' Evaluation of Students' Creativity by Gender and School Banding

	Boys		Girls		t	Entire sample	
	M	*SD*	*M*	*SD*		*M*	*SD*
Entire sample	2.7	1.0	2.9	.94	-3.89**	2.8	1.0
Low band	2.9	1.0	3.0	.85	-.98	2.9	.92
Medium band	2.4	1.2	2.7	1.1	-2.18*	2.6	1.1
High band	2.7	1.0	3.0	1.1	-3.38**	2.8	1.0

* $p \leq .05$. ** $p \leq .01$.

$df = 2184$, $p \leq .01$ and $t = 7.29$, $df = 2174$, $p \leq .000$). The relationship between teachers' perception of students' creativity was further analysed by performing stepwise regression analysis with teachers' ratings of the students' creativity as the dependent variable and the students' grades in the seven as well as the three major subjects, and school banding as the independent variables while controlling for age, gender, and parents education. Grades obtained in the three major subjects entered the regression equation in the first step (Beta = .204, $R^2 = .03$, $p \leq .000$) while school banding in the second step (Beta = -.128, $R^2 = .04$, $p \leq .000$). The demographic variables age, gender, and parents' education were removed from the equation model. These results indicated that among the variables controlled in the study teachers attached a great value to students' academic performance in English, Chinese, and Math while rating students' creativity level.

School banding comparison

Analysis of the evaluation of students' creativity by teachers of "high", "medium", and "low" band schools revealed that teachers of "low" band students perceived their students as most creative, whereas, "medium" band students were perceived by their teachers as least creative. The creativity level of "low" band students, as assessed by their teachers, was comparable to that of "high" band students while "medium" band students was significantly lower than the other two groups ($F(2, 1108) = 10.2$, $df = 2$, $p \leq .01$). Further support for this conclusion was offered by the outcome of stepwise regression analysis that school banding was a significant predictor of teachers' ratings of students' creativity with a negative beta value. These results presented in Table 6 are somewhat surprising and do not correspond with our earlier contention that teachers' assessment of creativity might be linked with students' academic achievements. This disparity needs special attention and exploration in further studies.

Comparison of Hong Kong Data with Those from Other Countries

Our data obtained from the Hong Kong Chinese students were compared with those reported by Urban (1996) for the German students (Table 6 &

Figure 1 Creativity Score by School Type and Country

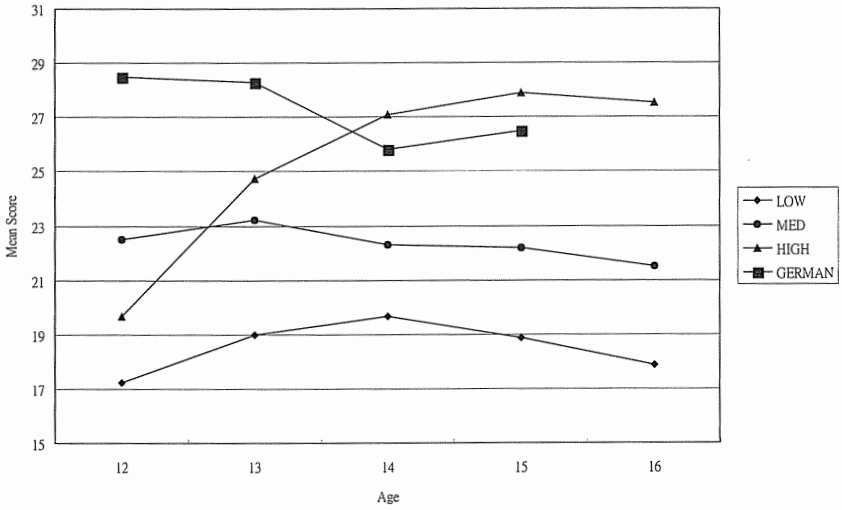

Table 8 The TCT-DP Descriptive Statistics by Country

County*	*n*	*M*	*SD*	Max.	Min.
United Kingdom	50	24.7	8.7	50	5
Germany	70	24	8.5	43	9
USA (Illinois)	40	22.6	9.4	49	9
Hong Kong	186	19.8	9.9	58.2	1

* Data for samples other than Hong Kong are from Jellen & Urban's (1989) study and were collected from the urban regular state funded schools.

Figure 1) and Jellen and Urban (1989) for the U.K., U.S.A., and German samples (Table 8). Despite the fact that all of these studies employed the TCT-DP and followed standardized procedures in test administration and scoring, the comparison should be treated as a cursory indication of certain developmental trends rather than as an accurate comparison. Such caution should be exercised due to a number of further methodological concerns regarding interrater reliabilities, sample representativeness, and testing context.

Data presented in Tables 6 and 8 suggest that if the entire sample is considered then the Hong Kong students' performance on the TCT-DP seems to be much lower that the German students' performance. The TCT-DP scores

of these two samples were strikingly different for ages 12 and 13, irrespective of the type of the school and for all ages. The TCT-DP scores of the "high" band students for ages 14 and 15 were close to or even slightly exceeded those of the German students from regular schools. The Hong Kong students attending "low" and "medium" band schools showed a drop in TCT-DP scores between the ages of 14 and 16. Such a slump was neither observed among the students attending "high" band schools nor among the German students.

Comparison of the TCT-DP scores of the Hong Kong 12-year-olds with the results obtained from other cultures (Table 8) reveals that the results achieved by the Hong Kong students place them well below students in highly industrialized countries such as the U.K., U.S.A., and Germany (Jellen & Urban, 1989).

Discussion

The major objectives of this study were to explore the development of creative potential of Hong Kong secondary school students, as measured by the Test of Creative Thinking–Drawing Production (TCT-DP), and to investigate the possible differences among students of different school bandings. Data regarding students' interest in the test, their self-assessed creativity as well as teachers' evaluation of their creativity were collected and analysed.

Based on the results of public examinations, Hong Kong students entering secondary level education are admitted to schools representing different academic standards, that is, ranging from Band 1 (the highest) to Band 5 (the lowest). Such ability grouping has been the widely accepted standard in the Hong Kong education system for many years. The ability grouping has its roots in the Confucian doctrine, which allows segregation and hierarchy among people of different ability levels and upholds the division of labour according to people's ability. The ability grouping also received some support from educationalists who argued that ability grouping allows

teachers to tailor their instruction to a homogeneous group of students. The students can benefit from cooperation, mutual facilitation, and working at the same pace (Lou, Abrami, & Spence, 2000). In the 80s ability grouping was one of the most controversial issues in educational policy and research studies in North America. Consequently, large-scale ability grouping was abolished (Slavin, 1993). In Hong Kong recently there is growing discontent among parents, teachers, and students with the rigid external examination system, and a school system that is very conservative. School banding has been criticised as unfair, especially to students in low ability groups. *The Education Blue Print for the 21st Century* (Education Commission, 2000) suggests abolishing premature streaming and reducing the number of bands from five to three by the school year 2001/2002. There is, however, a perennial lack of solid empirical studies showing the effect of school banding on Hong Kong Chinese students'intellectual and social development. The present study is a response to the existing need in Hong Kong for empirical investigation on the effect of school banding on students' development.

Our results provide interesting empirical data regarding school banding and developmental trends of students' creative potential. The examination of the developmental patterns across school bands shows that at the age of 12, regardless of the school banding, Hong Kong students tend to demonstrate a similar strength in their creative potential. The students of low and high banding show hardly any difference in creativity scores at the beginning of junior secondary schooling. However, starting from the age of 13 and up to 15, students in schools of higher banding achieve systematically higher creativity scores. As far as the developmental pattern of students of lower bandings is concerned, a slight improvement in creativity scores is observed between the ages of 12 and 13 followed by a systematic small decrease between the ages 14 to 16. Consequently, there is hardly any difference in creativity scores at the ages of 12 and the age of 16 for low band students and a slight drop in the scores for the medium band students. These results support Lou et al.'s (2000) argument that ability grouping leads to polarization of high and low ability students. That is, the development of

the former accelerates while the development of the latter slows down throughout the school years. One may hypothesise that the possible reason for the better performance of the high band students on the creativity test may result from their greater interest in the test task, since the high band students have demonstrated higher overall interest in completing creativity tasks. Further analysis, however, seems to suggest that the observed increment in the creative potential as measured by the TCT-DP is an effect of a developmental change, as students' interest in drawing a picture across age groups and bands was comparable.

In order to enhance students' creative thinking skills in secondary schools, additional resources should be allocated for students of lower banding, as long as banding remains the educational reality in Hong Kong schools. This may include creating an educational environment which can facilitate the development of creativity in a number of ways. One way could be through a structured approach, for instance, brainstorming skills (Osborn, 1963), creative problem-solving (Isaksen & Treffinger, 1985), and Cognitive Research Trust thinking kit (CoRT) (De Bono, 1986). Another way, may be through an infusion model of integrating creativity into the learning and teaching of various subjects, such as Chinese, English and Mathematics. Torrance's Incubation Model of teaching (Torrance, 1979, 1995) can be a useful tool in this regard. This model aims at heightening anticipation before the lesson, deepening students' expectation during the lesson, and organizing activities to keep learning going after the lesson.

Teachers' knowledge and skills in the identification of students' creativity are also crucial in effective creativity education. It was found in the study that teachers within a given school band had a tendency to associate a student's creativity with his/her academic achievement in general and with the student's performance in English, Chinese, and Mathematics in particular. It is worth noting that, Hong Kong teachers seem to have a tendency to perceive girls as more creative than boys as girls achieve higher school grades. Teachers' evaluations of students' creativity levels remain in a sharp contrast with the results of the TCT-DP. No gender differences were ob-

served in the entire sample, across different school bands and across age groups. These results are consistent with those observed for the German sample for the age group 12-16 (Urban & Jellen, 1996).

Interestingly, compared with high band and medium band teachers, low band teachers perceived their students as more creative. These results are somewhat difficult to interpret in the light of our earlier argument that Hong Kong teachers seem to associate creativity with students' academic performance. This observation needs special exploration and attention in further studies.

Our results are in tune with the often expressed opinion that Hong Kong students lag behind their Western counterparts in the development of creativity (Bond, 1991; Rudowicz, Kitto, & Lok, 1994). This conclusion, however, reflects the situation of students from the "low" and "medium" band schools only. The creativity scores of "high" band students are comparable or even slightly higher than those of the German students from regular schools. Courses on creativity in child and adolescent development should be offered as part of teachers' education. This would allow Hong Kong educators to recognize and to facilitate the development of the full range of human intellectual qualities, including creative potentialities.

Conclusion

The present findings suggest certain developmental trends in creativity across different ages and school bands among junior secondary school students in Hong Kong. However, it has to be acknowledged that these explorations are at an early stage. Thus, further longitudinal studies are required to confirm the present findings and to reveal any genuine developmental pattern of creativity development among Hong Kong Chinese students. It is hoped that such longitudinal studies could provide more empirical and theoretical insight into the possible reasons for the observed slump in creativity scores at the age of 14 in the students of low and medium school banding.

References

Ai, X. (1999). Creativity and academic achievement: An investigation of gender differences. *Creativity Research Journal, 12*, 329-337.

Bond, M. H. (1991). *Beyond the Chinese face*. Hong Kong: Oxford University Press.

Camp, G. C. (1994). A longitudinal study of correlates of creativity. *Creativity Research Journal, 7*, 125-144.

Chan, D. W., & Chan, L. (1999). Implicit theories of creativity: Teachers' perception of student characteristics in Hong Kong. *Creativity Research Journal, 12* (3), 185-195.

Collins, M. A., & Amabile, T. A. (1999). Motivation and creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 297-312). New York: Cambridge University Press.

Csikszentmihalyi, M. (1999). Implications of a systems perspectives for the study of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 313-335). New York: Cambridge University Press.

De Bono, E. (1986). *CoRT thinking [kit]*. New York: Pergamon Press.

Education Commission. (2000). *Education blueprint for the 21st century: Excel and grow*. Hong Kong: Government Printer.

Feldman, D. H. (1999). The development of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 169-186). New York: Cambridge University Press.

George, D., & Mallery, P. (1999). *SPSS for Windows step by step*. Boston, MA: Allyn and Bacon.

Greer, M., & Levine, E. (1991). Enhancing creative performance in college students. *Journal of Creative Behavior, 25*, 250-255.

Haddon, F. A., & Lytton, H. (1968). Teaching approach and the development of divergent thinking abilities in primary schools. *British Journal of Educational Psychology, 38*, 171-180.

Hennessey, B. A., & Zbikowski, S. (1993). Immunizing children against the negative effects of reward: A further examination of intrinsic motivation training techniques. *Creativity Research Journal, 6*, 297-308.

Isaksen, S. G., & Treffinger, D. J. (1985). *Creative problem-solving: The basic course*. Buffalo, NY: Bearly.

Jellen, H. G., & Urban, K. K. (1989). Assessing creative potential world-wide: The first cross-cultural application of the test for creative thinking — Drawing

production. *Gifted Education International, 6*, 78-86.

Lau, S., & Li, W. L. (1996). Peer status and perceived creativity: Are popular children viewed by peers and teachers as creative? *Creativity Research Journal, 9*, 347-352.

Lau, S., Cheung, P. C., Chan, D., Wu, W., & Kwong, J. (1998). *Creativity of School Children: The use of Wallach-Kogan creativity tests in Hong Kong.* (Tech. Rep. of RGC/93-94/18). Hong Kong: Hong Kong Baptist University, Center for Child Development.

Lou, Y., Abrami, P. C., & Spence, J. C. (2000). Effects of within-class grouping on student achievement: An exploratory model. *Journal of Educational Research, 94*, 101-112.

Mansfield, R. S., Busse, T. V., & Krepelka, E. J. (1978). The effectiveness of creativity training. *Review of Educational Research, 48*, 517-536.

Marjoribanks, K. (1976). Academic achievement, intelligence, and creativity: A regression surface analysis. *Multivariate Behavior Research, 11*, 105-118.

Osborn, A. (1963). *Applied imagination: Principles and procedures of creative thinking*. New York: Scribner.

Rudowicz, E. (2001). *Psychometric properties of the test for creative thinking-drawing production in the Hong Kong Chinese context.* Unpublished manuscript.

Rudowicz, E., & Hui, A. (1997). The creative personality: Hong Kong perspective. *Journal of Social Behavior and Personality, 12*(1), 139-157.

Rudowicz, E., Cheung, C. K., & Hui, A. (2001). *School underachievement: The Hong Kong case.* (Res. Rap. of SRG 7000724). Hong Kong: City University of Hong Kong.

Rudowicz, E., Kitto, J., & Lok, D. (1994). Creativity and Chinese socialization practices: A study of Hong Kong Chinese primary school children. *The Australian Journal of Gifted Education, 3*(1), 4-8.

Rudowicz, E., Lok, D., & Kitto, J. (1995). Use of the Torrance tests of creative thinking in an exploratory study of creativity in Hong Kong primary school children: A cross-cultural comparison. *International Journal of Psychology, 30*(4), 417-430.

Runco, M. A., & Charles, R. E. (1997). Developmental trends in creative potential and creative performance. In M. A. Runco (Ed.), *The creativity research handbook* (Vol. 1, pp. 115-152). Cresskill, NJ: Hampton Press.

Runco, M. A., Johnson, D. J., & Baer, P. K. (1993). Parents' and teachers' implicit theories of children's creativity. *Child Study Journal, 23*, 91-113.

Slavin, R. E. (1993). Ability grouping in the middle grades: Achievement effects and alternatives. *Elementary School Journal, 93*, 535-552.

Spinks, J. A., Ku-Yu, S. Y., Shek, D. T. L., & Bacon-Shone, J. H. (1995). *The Hong Kong Torrance test of creative thinking*. (Tech. Rep.). Hong Kong: The University of Hong Kong.

Torrance, E. P. (1968). A longitudinal examination of the fourth-grade slump in creativity. *Gifted Child Quarterly, 12*, 195-199.

Torrance, E. P. (1979). An instructional model for enhancing incubation. *Journal of Creative Behavior, 13*, 23-35.

Torrance, E. P. (1995). *Why fly? A philosophy of creativity*. Norwood, NJ: Ablex.

Treffinger, D. J., Speedie, S. M., & Bruner, W. D. (1974). Improving children's creative problem-solving ability: The Purdue creativity project. *Journal of Creative Behavior, 8*, 20-30.

Urban, K. K. (1991). On the development of creativity in children. *Creativity Research Journal, 4*, 177-191.

Urban, K. K., & Jellen, H. G. (1996). *Test for creative thinking — Drawing production*. Frankfurt: Swets Test Services.

Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children*. New York: Holt, Rinehart, & Winston.