Educational Research for Policy and Practice (2005) 4: 47–64
DOI 10.1007/s10671-005-1546-7

Effect of School Decentralization and School Climate on Student Mathematics Performance: The Case of Hong Kong

Esther Sui Chu Ho
Faculty of Education Department of Educational Administration and Policy
The Chinese University of Hong Kong
Hong Kong
(E-mail:estherho@cuhk.edu.hk)

Abstract

For more than a decade, the Government of Hong Kong has instituted a policy of school decentralization aimed at devolving authority to all stakeholders, including the representatives of School Sponsoring Bodies, principals, teachers, parents, and community members. This study examines the relative contribution of two dimensions of school decentralization – teacher participation and school autonomy – to students' mathematics performance, and examines the role of school climate as a mediating variable between decentralization and performance. Data for the present study come from the second cycle of the Programme for International Student Assessment (PISA 2003), which is a large international assessment measuring 15-year-old students' literacy performance across over 40 countries and regions around the world. Using multi-level analysis, the study finds that teacher participation is more important than school autonomy for student mathematics performance in Hong Kong. In addition, the effect of teacher participation on students' performance is mediated by four major school climatic factors – sense of belonging, disciplinary climate, students' morale and student behaviour – in Hong Kong's secondary schools.

Key Words: education achievement, educational decentralization, effect of school decentralization on student performance, school autonomy, school climate, teacher participation

Introduction

Decentralization is the transfer of authority from a higher level of government to a lower organizational level (Brown, 1990; McGinn and Street, 1986; Welsh and McGinn, 1999). In education, Brown (1994) has defined decentralization as the devolution of authority from a department of education to local educational authority and to individual schools. This delegation implies that schools make significant decisions about personnel, services, equipment, and supplies.

The decentralization movements in many nations tend to emphasize better organization, economic efficiency, local empowerment, and greater democratic participation (Beattie, 1985; Brown, 1990, 1994; Education Commission, 1998). Advocates believe that decentralization offers people more control and input in their lives (Brown, 1990; Chapman, 1973).

In educational settings, school decentralization is expected to respond to different school problems such as increasing efficiency and effectiveness, empowering teachers and parents, enhancing community involvement or shifting the cost burden of education from the central government to local level such as school. After reviewing over 300 theoretical and empirical studies, Murphy and Beck (1995) asserted that decentralization policies such as school-based management (SBM) failed to improve school effectiveness and student learning. They suggested that reformers might have been promising too much when they suggested SBM as a panacea for economic crises, social problems, post-industrial issues and the failing health of educational systems.

Another interpretation given by Elmore (1993, 1995) and Beck and Murphy (1998) is that structural change cannot succeed without cultural change. Some studies suggest that any positive effect of school decentralization on school effectiveness and student learning might be mediated by its effect on school processes such as improving school climate, enhancing accountability and increasing flexibility and responsiveness (Brown, 1990; Hannaway, 1993; Murphy and Beck, 1995). School decentralization can contribute to improvement in the school climate by enhancing teachers' morale and commitment and by nurturing learning norms and caring norms within schools (Beck and Murphy, 1998; Brown, 1990, 1994). However, limited research has been done to examine the extent and degree to which school decentralization is related to school climate, both of which affect students' learning outcomes (Walberg et al., 2000).

The purpose of this paper is to examine the nature of school decentralization and its impact on students' mathematics performance in Hong Kong. Data in this research were taken from the PISA 2003 study. A total of 4,478 students from 145 secondary schools in Hong Kong participated in the study. The paper has four sections. The first reviews the background to school decentralization in Hong Kong. The second describes the database and operationalization of the variables. The third presents the results and discussion. The final section summarizes the major findings and examines implications for policy and research.

The analysis employs a multi-level design. Since two dimensions of school decentralization were measured in the PISA 2003 study – school autonomy and teacher participation – the third section of the paper examines the relative contribution of school autonomy and teacher participation to mathematics performance, and then addresses the extent to which the

effect of school decentralization on students' mathematics performance is mediated by school climate.

School Decentralization in Hong Kong

Education decentralization reform in Hong Kong started with the public sector review in the 1990s. The first objective of public sector reform was to examine the structure and relationships within the Hong Kong Government in order to *improve efficiency, make the best use of the resources available, provide a better service for the community,* and *bring greater job satisfaction to the civil service* (Tsang, 1995). The Education and Manpower Bureau (EMB) was identified as the leading candidate for the study of branch–agency relationship in the public sector, mainly because it was responsible for the largest government expenditure, namely education. The study focused on the relationship between the Education and Manpower Bureau and the Education Department (ED), the latter responsible for school education programmes. The study reviewed policy and administrative documents, and interviewed a large number of staff in the Education Department, as well as government school principals and administrators in the aided sectors (i.e. Government funded school sectors in Hong Kong). The research questions focused on the objectives, roles, relationships, authorities, and perceived problem areas of education sectors in Hong Kong. The overall feedback from both departmental staff and aided sector educators was that the framework then in existence for managing school education programmes needed fundamental reforms.

In March 1991 the Government published a booklet entitled *The School Management Initiative: Setting the Framework for Quality in Hong Kong Schools* (EMB & ED, 1991). The School Management Initiative (SMI) proposals were well received by the Education Committee, the Board of Education, the Legislative Council Education Panel, and also by the main Teachers' Union. School principals and sponsoring bodies were generally interested in the proposal. However, some were concerned about the loss of authority within the school system under the SMI, while others saw an opportunity to gain more authority. In general, however, the goal of making schools more accountable to ensure equality of educational service was not fully understood. The response was therefore not surprising – a majority of schools adopted a "wait and see" attitude towards the new management scheme.

When the SMI scheme was launched in 1992, it only received lukewarm support from schools. As late as 1997, six years after its implementation, only about 30% of the schools in Hong Kong had joined the programme (ED, 2000). However, in 1998, the policy was pushed firmly by the government under a new name – SBM.

The Educational Commission Report Number 7 recommended that SBM – in the spirit of SMI – be implemented in all schools by 2000 (EC, 1998). It recommended that schools implement the SBM structures, such as formal procedures for setting school goals, school profiles, budgeting, development plans and means for evaluating progress and staff appraisal. While the principals are major decision makers in the Hong Kong model of SBM, teachers and parents are also involved in school-based decision making now. The effect of this particular type of SBM model on school processes and outcomes are worthy of investigation.

Database

The primary database used in this paper is derived from the second cycle of the Programme for International Student Assessment (PISA) conducted in 2003, a large international assessment of 15-year-old students assessing their reading, mathematical and scientific literacy performance across over 40 countries and regions around the world. The PISA constitutes one of the most comprehensive and rigorous international assessments of student performance to date. It is conducted under the aegis of the Organization for Economic Cooperation and Development (OECD). In PISA 2003, the major subject domain is mathematics, therefore, about two-thirds of testing time was devoted to this domain. The assessment focuses on the functional use of mathematics, and the ability to recognize, formulate, and solve mathematical problems in various situations (OECD, 2004). The performance scores are scaled with the mean performance of OECD student set at 500 and a standard deviation of 100.

Operationalization of School Decentralization and School Climate

The PISA 2003 study collected information from principals about the extent to which school personnel are involved in decision-making about school policies and management. Principals were asked to report whether decision-making responsibilities were centralized to higher educational authorities, and whether schools had any influence in appointing or electing school boards, principals, department heads, or teachers. Twelve decision-making items were used in the principal questionnaire, covering the areas of: appointing teachers, dismissing teachers, establishing teachers' starting salary, determining teachers' salary increases, formulating school budgets, allocating budgets within the school, establishing student disciplinary policies, establishing student assessment policies, approving students for admittance to schools, choosing textbooks, determining course content and deciding courses to offer. The items are shown in Table I.

Table I
Percentage of principals reporting their schools have responsibility for school policy and management issues in PISA 2003.

Five decision areas	Administrative items	Hong Kong (%)	OECD/PISA 2003 (%)
Staffing	Appointing teachers	91.2	64.3
	Dismissing teachers	92.4	58.0
Teacher salary	Establishing teachers' starting salaries	37.9	36.6
	Determining teachers' salary increases	13.9	37.7
Budgeting	Formulating the school budget	97.5	67.8
	Deciding on budget allocations within the school	98.8	93.3
Student affairs	Establishing student disciplinary policies	100.0	97.1
	Establishing student assessment policies	100.0	92.6
	Approving students for admittance to school	97.3	83.7
Curriculum and instructions	Choosing which textbooks are used	100.0	94.4
	Determining course content	98.0	76.6
	Deciding which courses are offered	99.3	81.9

Note: The % indicates the proportion of principals report their school have responsibility to make decisions in different areas

Indices of "school autonomy" and "teacher participation" were constructed as follows, based on responses to these 12 items.

- *School Autonomy*. Each item asked principals who has the main responsibility for the different types of decisions regarding the management of the school. The response category "not a main responsibility of the school" was scored 0, and others were scored 1. Scores were then summed across the 12 items.
- *Teacher Participation*. In this case, the response category "teacher", indicating that teachers have the main decision making responsibility for a particular area, was scored 1 and other responses were scored 0. Scores were then summed across the 12 items.

Higher scores on each index indicate higher levels of school autonomy and teacher participation respectively. The Cronbach alphas for the two scales were 0.5979 and 0.6285, respectively.

There are different approaches to operationalizing school climate in the literature (e.g. Haller and Kleine, 2001; Hoy et al., 1990, 1991; Tagiuri, 1968;). Hoy et al. (1990, 1991) suggest that school climate is a relatively enduring quality of the school environment that is experienced by participants, affecting their behaviour, and is based on their collective perceptions of behaviour in schools. In the present study, the measures of school climate focus on students' and principals' collective perceptions of the social system of schools. Nine constructs were used to measure the different dimensions of school climate. Five indices of school climate were aggregated from the student questionnaire and included sense of belonging, attitude towards schools, disciplinary climate, student–teacher relationship, and teacher support. The remaining four indices were constructed from the school questionnaire reported by the principals or school administrators, and included student morale, teacher morale, student behaviour, and teacher behaviour.

School Climate from Students' Perspective

For each index described below, a four point Likert scale was used, and item scores were summed, with some items reverse scored so that higher aggregate scores indicate more positive perceptions. Alpha reliability coefficients for each scale are shown in brackets.

- *Attitudes toward School* (0.6448). This index is derived from students' responses to four items: school has done little to prepare me for adult life when I leave school; school has been a waste of time; school helped give me confidence to make decisions and school has taught me things which could be useful in a job.
- *Student–Teacher Relations* (0.8057). This index is derived from students' responses to five items: students get along well with most teachers; most teachers are interested in students' well-being; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers and most of my teachers treat me fairly.
- *Sense of Belonging* (0.7396). This index is derived from students' responses to six items: I feel like an outsider; I make friends easily; I feel like I belong; I feel awkward and out of place; other students seem to like me; and I feel lonely.
- *Teacher Support* (0.8353). This index is derived from students' responses to five items: the teacher shows an interest in every student's learning; the teacher gives extra help when students need it; the teacher helps students with their learning; the teacher continues teaching until the

students understand and the teacher gives students an opportunity to express opinions.
- *Disciplinary Climate* (0.8799). This index is derived from students' responses to five items: students don't listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students to quiet down; students cannot work well and students don't start working for a long time after the lesson begins.

School Climate from Principals' Perspective

Again, four point Likert scales were used, and item scores were summed after reverse scoring as appropriate, so that higher scores indicate more positive perceptions. Again, alpha coefficients are shown in brackets.

- *Teacher Morale and Commitment* (0.7957). This index is derived from principals' responses to four items: the morale of teachers in this school is high; teachers work with enthusiasm; teachers take pride in this school; teachers value academic achievement.
- *Student Morale and Commitment* (0.8534). This index is derived from principals' responses to seven items: students enjoy being in school; students work with enthusiasm; students take pride in this schools; students value academic achievement; students are cooperative and respectful; students value the education they can receive in this school and students do their best to learn as much as possible.
- *Teacher Behaviour-Health Climate* (0.9208). This index is derived from principals' responses to seven items: teachers' low expectations of students; poor student–teacher relations; teachers not meeting students' needs; teacher absenteeism; staff resisting change; teachers being too strict with students; and students not being encouraged to achieve their full potential.
- *Student Behaviour-Health Climate* (0.9258). This index is derived from principals' responses to six items: student absenteeism; disruption of classes by students; students skipping classes; students lacking respect for teachers; students' use of alcohol or illegal drugs; and students' intimidating or bullying other students.

Results and Discussion

Hong Kong School Decentralization and School Climate in an International Context

Table 1 displays the percentage of schools where principals reported that schools have responsibility for school policy and management issues in

Hong Kong as compared to the OECD average. The table provides a breakdown of all five aspects of school policy issues. Schools in most OECD countries have less say than schools in Hong Kong in establishing teachers' starting salaries (37%) and in determining teachers' salary increases (38%). OECD schools also have limited authority in appointing teachers (64%) or dismissing teachers (58%). However, there appears to be greater influence for OECD schools in formulating the school budget (68%) and allocating resources within the school (93%). On average, across OECD countries, schools play an important role in student affairs. Over 80% of principals reported that schools have the authority to establish student disciplinary policies, and over 90% of schools can establish student assessment and student admittance policies. Of the three items on curriculum and instruction, about 94% of the schools reported that they have authority to choose textbooks, about 77% of schools can determine course content and about 82% of the schools can decide upon the courses to offer.

Comparing the OECD average with Hong Kong, it is interesting to find that the latter has a higher percentage of schools reporting influence at the school level in almost all aspects studied of school decentralization. Only in one – determining teachers' salary increases – does Hong Kong appear to have less school autonomy. Thus Hong Kong has a higher degree of school autonomy than the OECD average in the four aspects of school policy and management – staffing, budgeting, student affairs, curriculum instructions – than the OECD average. However, Hong Kong schools have less influence on setting teachers' salaries. Principals' and students' responses to the questions concerning school decentralization and school climate are summarized in Figure 1. The indices of school autonomy and teachers participation in Hong Kong are 0.58 and 0.29, respectively, which are slightly higher than the OECD average of zero. It can be argued that Hong Kong schools enjoy relatively high autonomy at the school level; however, teachers may not share authority and responsibility in decision-making. Whether this lack of empowerment of teachers affects the collegiality and school climate is explored in section "Correlations between School Decentralization and School Climate".

Of the nine indices of school climate, five are negative and the remaining four are positive, compared with the OECD average of zero. Hong Kong principals' view of student behaviour is more positive than the OECD average. Hong Kong students' perceptions of teachers' support, student–teacher relationships, and the disciplinary climate in the school are slightly higher than the OECD average. However, Hong Kong students' sense of belonging and their attitude towards schools are far lower than the OECD average, and Hong Kong principals' views of teachers' behaviour, teacher morale and student morale are also substantially lower than the OECD average.

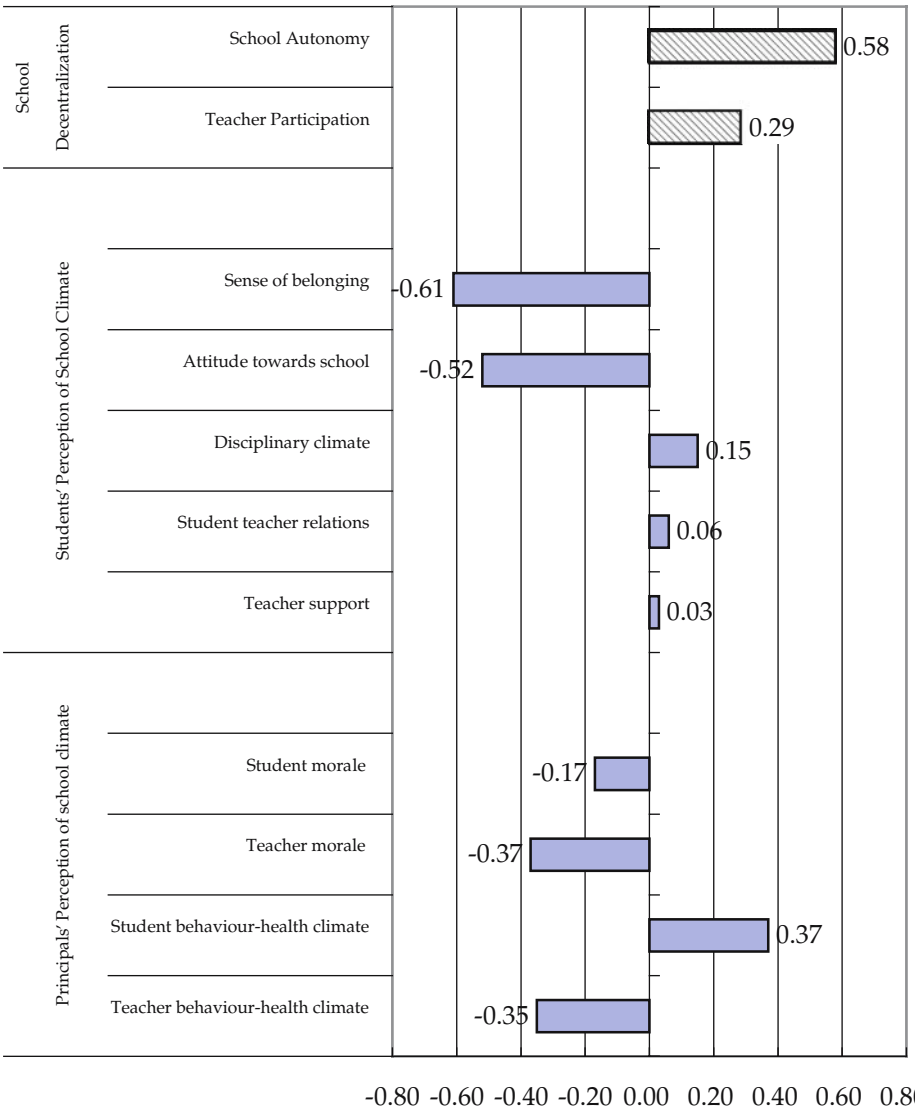

Figure 1. Indices of School Decentralization and School Climate in Hong Kong Schools. Notes: These indices are scaled using item response theory with OECD averages equal to 0 and OECD standard deviations equal to 1. Positive values on these indices indicate higher scores than the OECD average. Negative values on these indices indicate lower scores than the OECD average. For instance, the index of school autonomy of Hong Kong of 0.58 indicating that Hong Kong school principals' perception of school autonomy in decision making is higher (by just over half of one standard deviation) than the OECD average.

Correlations Between School Decentralization and School Climate

Table II shows the Pearson product–moment correlation coefficients among the indices of school decentralization and school climate. All indices based on students' perceptions are aggregated at the school level. The results indicate that school autonomy is related negatively to student behaviour but positively related to teacher support, whereas teacher participation is related to student behaviour only. In other words, schools with more autonomy tend to have higher levels of teacher support for student learning, but are also likely to have more student behavioral problems. However, if schools delegate more authority at the teacher level, their students' behaviour may well improve. Overall, the influence of school decentralization on school climate appears to be small in Hong Kong's secondary schools.

The nine indices of school climate are highly inter-correlated. In particular, student and teacher morale are significantly related to all aspects of school climate. Student behaviour is also strongly correlated with teacher behaviour but weakly associated with student–teacher relationship. The five indices of school climate based on students' perceptions also highly inter-correlated. This means that a positive school climate is one where students report a strong sense of belonging to their schools, positive attitudes toward them, an orderly disciplinary climate, good relationships with their teachers, and support of teachers towards the students when that is needed.

Correlations Between School Decentralization, School Climate, and Students' Mathematics Performance

Table III shows that average school performance in mathematics has a significant positive relationship with teacher participation but no association is found between mathematics performance and school autonomy in Hong Kong. The results suggest that delegation of authority to school level does not necessarily contribute to improved school performance. It is the involvement of teachers that can really make a difference to student learning, with more teacher participation in decision-making associated with better mathematics performance. All five indices of school climate as perceived by students have significant and positive associations with students' mathematics performance. Sense of belonging and disciplinary climate appear to make the strongest contribution to mathematics performance, whereas student teacher relationship is the weakest school climate factor affecting mathematics performance. Of the four indices of school climate based on principals' perceptions, student morale and teacher morale show the strongest positive relationship with students' mathematics performance. Student behaviour also has a positive but weak relationship with

Table II
Correlation coefficients between indices of school decentralization and school climate.

	1	2	3	4	5	6	7	8	9	10	11
1. School autonomy	1	.000	−.093	−.016	−.185*	−.158	.102	.071	.052	.047	.186*
2. Teacher participation		1	.076	.142	.179*	.034	.081	.132	.118	.138	.112
3. Student morale			1	.617***	.263**	.227**	.384***	.391***	.442***	.219**	.329***
4. Teacher morale				1	.328***	.342***	.287***	.218**	.227**	.283**	.237**
5. Student behaviour -health climate					1	.867***	.041	.122	.119	.163*	.145
6. Teacher behaviour -health climate						1	.027	.132	−.013	.150	.099
7. Sense of belonging							1	.731***	.353***	.476***	.354***
8. Attitudes toward schools								1	.296***	.514***	.383***
9. Disciplinary climate									1	.376***	.496***
10. Student–teacher relationship										1	.540***
11. Teacher support											1

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

the students' performance whereas the relationship between teacher behaviour and mathematics performances is not significant.

Multi-level Analysis of the Effect of School Climate and Decentralization on Students' Mathematics Performance

First, a null model was used to partition the variance in mathematics performance into within-school and between-school portions. The results indicate that students' mathematics scores vary substantially among schools in Hong Kong. The proportion of variation between schools is 46.6%,

Table III
Correlation coefficients of school decentralization and school climate on school mean mathematical literacy performance.

	School mean mathematical literacy
School decentralization	
School autonomy	−.064
Teacher participation	.194 *
Students' perception of school climate	
Sense of belonging	.490 ***
Attitudes toward school	.385 ***
Disciplinary climate	.544 ***
Student teacher relationship	.184 *
Teacher support	.229 **
Principals' perception of school climate	
Student morale	.586 ***
Teacher morale	.359 ***
Student behaviour-health climate	.261 **
Teacher behaviour-health climate	.116 ns

Note: $^{*}p < 0.05$;$^{**}p < 0.01$;$^{***}p < 0.001$. ns: not significant

which is much higher than the OECD average of 32.7%. This indicates high heterogeneity among Hong Kong's secondary schools in mathematics performance. Model 1 builds on the null model by adding four student background variables as controls. The results indicate that girls and immigrant students tend to perform significantly worse than boys and local students. Students from single-parent families also scored worse than those from other family structures. Model 2 builds on Model 1 by adding the two indices of school decentralization. This model examines the relative contribution of school autonomy and teacher participation on student mathematics performance after controlling for student background. Model 3 then includes the nine indices of school climate. All three models are shown in Table IV.

Effect of School Decentralization on Mathematics Performance

Model 2 of Table IV shows the effect of school decentralization on students' mathematics performance after student background factors have been taken into account. The results show that school autonomy does not have significant effect on students' mathematical performance. However, teacher participation is positively related to mathematics scores. Students scored an average 14 points higher in mathematics for a one-unit increase

Table IV
Effects of school decentralization and school climate on students' mathematics performance.

Predictor	Model 1 Student background		Model 2 + school decentralization		Model 3 + school climate	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	554.45***	5.68	554.45***	5.56	554.41***	3.71
Student background						
Girl	−19.03***	3.05	−19.16***	3.04	−20.42***	3.01
Immigrant student	−21.48***	3.56	−21.44***	3.58	−21.41***	3.57
Single parent	−6.32*	2.97	−6.32*	2.97	−6.15*	2.96
SES	−0.05	1.68	−0.07	1.68	−0.28	1.67
School decentralization						
School autonomy			−3.05	5.52	−0.83	3.69
Teachers participation			13.75*	5.34	6.26	4.37
Students' perception of school climate						
Sense of belongings					23.04***	5.55
Attitudes toward schools					−0.49	6.00
Disciplinary climate					25.80***	4.88
Student teacher relationship					−11.00*	5.20
Teacher support					−8.60	4.63
Principals' perception of school climate						
Student morale					20.90***	5.08
Teacher morale					0.08	4.91
Student behaviour					23.76**	7.85
Teacher behaviour					−14.79	7.92
Between school variance	4337.23***		4199.89***		1812.38***	
Within school variance	4892.78		4892.72		4892.69	
Between school variance explained	1.80%		4.91%		58.97%	
Within school variance explained	2.73%		2.73%		2.73%	
Total variance	9230.01		9092.61		6705.07	
Total variance explained	2.29%		3.75%		29.02%	

Note: $^{*}p < 0.05$;$^{**}p < 0.01$;$^{***}p < 0.001$

in teacher participation in school decision making. The two school decentralization factors explained only 4.91% of the between school variance and 2.73% of the within school variance, and the total variance explained is only 3.75%. In other words, the impact of school decentralization factors is very marginal, a finding that is consistent with other decentralization studies in education (Malen and Ogawa, 1988; Malen, et al., 1990).

Effect of School Climate on Mathematics Performance

Model 3 of Table 4 shows the impact of school climate on mathematics performance and the effect of school decentralization as mediated by school climate. This model shows that the effect of teacher participation disappears when the school climate indices are included in the model. Of the five indices of climate based on student perceptions, sense of belonging and disciplinary climate have significant positive associations with mathematics scores. Students scored an average of 23 and 25 points higher in mathematics for every unit increase in students' sense of belonging and their perception of disciplinary climate respectively. It appears then that schools with stronger sense of belonging and an orderly disciplinary climate are more likely to have higher performance in mathematics. However student–teacher relationship shows a negative association with students' mathematics performance. This negative effect of student–teacher relationship is counter-intuitive, but may arise because the five student-perception indices of school climate are highly interrelated. As a result, the strong effect of other climatic factors might suppress the regression coefficient of student–teacher relationship to a negative value. Of the four school climate indices derived from principals, student morale and student behaviour are significantly related to students' mathematics performance. Students scored an average of 21 and 24 points higher in mathematics for every unit increase in students' morale and students' behaviour respectively. The nine school climatic factors together with the previous two school decentralization factors explain 59.97% of the between-school variance and 2.73% of the within-school variance. This final model explains a total of 26.66 % of the total variance of mathematics performance for Hong Kong students.

Conclusions and Implications

This paper has examined the nature and impact of school decentralization and school climate in Hong Kong's secondary schools. The Hong Kong government has been trying for more than a decade to decentralize school decision making in order to devolve power to all stakeholders at the school level. Findings from this study suggest that the levels of school

autonomy and teacher participation in Hong Kong secondary schools are slightly above the OECD average. In particular, school administrators and teachers are more involved in staffing, budgeting, curriculum and instruction, and student affairs. Consistent with the average of OECD countries, Hong Kong's schools have little say in setting teachers' salary. Although Hong Kong appears to enjoy relatively high school autonomy by international standards, teachers' participation is not as strong as expected. In other words, the SBM model manifested in Hong Kong is more likely to be "school-driven" rather than "teacher-driven".

Previous research has not produced convergent findings on the relationship between decentralization and school performance (Astiz et al., 2002; Cheng, 1992; Cheung and Cheng, 1996; Malen et al., 1990; Murphy and Beck, 1995; Sackney and Dibski, 1994; Summers and Johnson, 1996; Wong, 1993). Findings from this study suggest that, in terms of the two school decentralization indices used here, there is a significant but small positive impact of teacher participation in school governance on student's mathematics performance in Hong Kong even after student background factors have been taken into account, but no impact of school autonomy on mathematics performance.

As for the effect of school climate on student performance in Hong Kong, four factors – sense of belonging, disciplinary climate, student morale, and student behaviour – are major contributors to students' achievement. It is interesting to find that all the four climatic factors are student-oriented regardless of whether they are reported by students or principals. The results also indicate that after school climate factors have been taken into account, the positive effect of teacher participation on students' performance disappears. Thus the contribution of teacher participation in school governance to students' performance outcomes seems to be mediated by school climate.

Intercorrelations between the nine climate factors show that the indices of sense of belonging and disciplinary climate are strongly and positively correlated with teacher-student relationship and teacher support. These results are consistent with past studies showing that teachers who build strong relationships with their students and support their learning create a positive disciplinary climate and greater sense of belonging among their students (e.g., Anderman, 2002; Ma, 2003; McNeely et al., 2002; Murdock et al., 2000; Osterman, 2000), which in turn will likely improve students' academic achievement (Reiman et al., 1995).

To conclude, enhancing teacher participation and improving school climate through teacher empowerment and professional training appears to be a promising avenue for further school improvement in Hong Kong. Further studies could examine reasons behind the relatively low level of teacher participation in decision-making in Hong Kong secondary schools. It is

worth noting that Hong Kong was among the lowest ranked in the sense of belonging students felt for their schools (OECD, 2002). How policy makers in Hong Kong could empower teachers under the current SBM reform, and how educators in Hong Kong nurture students' sense of belonging under the current competitive and alienated learning environment, are major challenges for Hong Kong, as well as for such other Asian societies as Japan, Korea and Singapore. To what extent school decentralization and school climate factors could affect other non-cognitive outcomes – such as students' motivation, attitudes towards learning and self-concept – are important research questions worthy of further study.

Acknowledgements

This research is part of the large-scale project of "Programme for International Student Assessment of Hong Kong". The author is grateful for the support received from the Direct Grant and the United College Endowment Fund of The Chinese University of Hong Kong, and Quality Education Fund and the Educational Manpower Bureau of the Hong Kong Government. Opinions expressed in this article are the author's and do not necessarily reflect those of the granting agency. In addition, thanks are extended to the HKPISA research team members for the support to the research and Professor Keith Punch for his valuable comments for improving this manuscript.

References

Astiz, M. F., Wiseman, A. W. & Baker, D. P. (2002). Slouching towards decentralization: Consequences of Globalization for curricular control in national education systems. *Comparative Educational Review, 46* (1), 66–88.

Anderman, E. M. (2002). School effects on psychological outcomes during adolescence. *Journal of Educational Psychology, 94* (4), 795–809.

Beattie, N. (1985).*Professional Parents: Parent Participation in Four Western European Countries.* London: The Falmer Press.

Beck, L.G. & Murphy, J. (1998). Site-based management and school success: Untangling the variables. *School Effectiveness and School Improvement, 9* (4), 358–385.

Brown, D. J. (1994). Decentralization in educational governance and management. In Husen, T. and Postlewaite (Eds.), *The International Encyclopedia of Education.* Oxford: Pergamon Press. pp. 1470–1411.

Brown, D.J. (1990) *Decentralization and School-based Management.* New York: Falmer Press.

Chapman, R. (1973). Decentralization: Another perspectives. *Comparative Education, 9* (3), 127–134.

Cheng, Y.C. (1992). A preliminary study of school management initiative: Responses to induction and implementation of management reforms.*Educational Research Journal*, *7*, 21–32.

Cheung, W.M. & Cheng, Y. C. (1996). A multi-level framework for self-management in school. *International Journal of Educational Management*, *10* (1), 17–29.

Education Commission (EC). (1998). *Education Commission Report No. 7*. Hong Kong: The Government Printer.

Education Department (ED). (2000). *Transforming Schools into Dynamic and Accountable Professional Learning Communities: School based Management Consultation Document*. Hong Kong: Advisory Committee on School Based Management.

Education Manpower Branch and Education Department (EMB & ED). (1991). *School Management Initiative: Setting the Framework for Education Quality in Hong Kong Schools*. Hong Kong: The Government Print.

Elmore, R.F. (1993). School decentralization: Who gains? Who loses? In Hannaway, J. and Carnoy, M. (Eds.), (33–54). *Decentralization and School Improvement.* San Francisco, CA: Jossey-Bass.

Elmore, R.F. (1995). Structural reform and educational practice. *Educational Researcher,* 24, 23–26

Haller E.J. & Kleine, P.F. (2001). School climate and the matter of measurement. In *Using Educational Research: A School Administrator's Guide* (pp. 333–367). New York: Longman.

Hannaway, J. (1993) Decentralization in two school districts: Challenging the standard paradigm. In Hannaway, J. and Carnoy, M. (Eds.) (1993). *Decentralization and School Improvement: Can we fulfill the* promise (pp.135–162). San Francisco: Jossey-Bass.

Hoy, W.K. & Tarter, C.J.; Bliss, J.R. (1990). Organizational climate, school health, and effectiveness: A comparative analysis. *Educational Administration Quarterly, 26*, 260–279.

Hoy, W.K., Tarter, C. J. & Kottkamp, R.B. (1991). *Open Schools/Healthy Schools: Measuring Organizational Climate.* Newbury Park, CA: Sage Publications, Inc.

Ma, X. (2003). Sense of belonging to school: Can schools make a difference? *The Journal of Educational Research*, *96* (6), 340–349.

Malen, B. & Ogawa, R. T. (1988). Professional-patron influence on site-based governance councils: A confounding case study. *Educational Evaluation and Policy Analysis, 10* (4), 251–270.

Malen, B., Ogawa, R. T. & Kranz, J. (1990). What do we know about school based management: Case study of the literature – a call for research. In Clune, W. and Witte J. (Eds.), *Choice and Control in American Education: Volume 2* (289–342). New York: Falmer.

McGinn, N. & Street, S. (1986). Educational decentralization: Weak state or strong state? *Comparative Education Review*, *30* (4), 471–489.

McNeely, C. A., Nonnemaker, J. M. & Blum, R. W. (2002). Promoting school connectedness: Evidence from the national longitudinal study of adolescent health. *Journal of School Health*, *72*, 138–146.

Murdock, T. B., Anderman, L. H. & Hodge, S. A. (2000). Middle-grade predictors of students' motivation and behaviour in high school. *Journal of Adolescent Research, 15,* 327–351.

Murphy, J. & Beck, L.G.(1995). *School-based management as school reform: Taking stock*. Thousand Oaks, CA: Corwin Press.

OECD. (2002). *Reading for Change: Performance and Engagement Across Countries: Results form PISA2000*. Paris: Organization for Economic Co-operation and Development.

OECD. (2004). *Learning for Tomorrow's World: First Results from PISA 2003*. Paris: Organization for Economic Co-operation and Development.

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, *70* (3), 323–367.

Reiman, Alan, Bostick, D., Lassiter, J. & Cooper. J. (1995). Counselor and teacher-led support groups for beginning teachers: A cognitive developmental perspective. *Elementary School Guidance & Counseling*, *30* (2), 105–117.

Sackney, L.E. & Dibski, D.J. (1994). School-based management: A critical perspective. *Educational Management and Administration*, *22* (2), 104–112.

Summers, A.A. & Johnson, A.W. (1996). The effects of school-based management plans. In Hanushek, E.A. and Jorgenson, D.W. (Eds.), *Improving America's school: The role of incentives* (75–96). Washington, DC: National Academy Press.

Tagiuri, R. (1968). The concept of organizational climate. In Tagiuri, R. and Litwin, G.W. (Eds.), *Organizational climate: Explorations of a concept* (1–32). Boston: Harvard University, Division of Research, Graduate School of Business Administration.

Tsang, D. (1995). Public Sector Reform: Key Issues and Future Directions. In Lee, Jane C.T and Cheung, Anthony B.L. (Eds.) *Public Sector Reform in Hong Kong : Key Concepts, Progress-to-date and Future Directions* (3–14). Hong Kong : Chinese University Press.

Walberg, H. J., Paik, S.J., Komukai, A. & Freeman, K. (2000). Decentralization : An international perspective. *Educational Horizons, 78* (3), Spring 153–164.

Welsh, T. & McGinn, N. (1999). Decentralization of Education: why, when, what and how? *Fundamentals of Educational Planning* 64. UNESCO.

Wong, K. C. (1993). School-based Management, School Effectiveness and the School Management Initiative: Different? How Different? In Tsui and Johnson (Eds.) *Teacher Education and Development Education* Paper 18 (45–59). Hong Kong: Faculty of Education, The University of Hong Kong.