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# *Characteristics of East Asian Learners: What We Learned From PISA*

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*Current international studies have shown that students in East Asian societies outperformed their Western counterparts. Evidence from both the Third International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) have suggested that East Asian Learners did much better in Mathematics and Science than their counterparts in North American and European countries (Martin et al., 2000, Mullis, et al., 2000; Organisation for Economic Co-operation and Development, 2003, 2004). A number of scholars attempted to attribute the remarkable educational achievement of students to the Asian model of learners, with particular focus on the Chinese ways of learning and teaching (e.g., Li, 2004; Schneider & Lee, 1990; Stevenson and Stigler, 1992; Watkins & Biggs, 1996, 2001; Wong, 2004). Yet, previous studies have usually treated (East) Asian students as one general category and not differentiated between different groups of Asians. Using data from PISA2000+ and PISA2003, this study found that there are certain*

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*convergences in the East Asian societies which might be seen as the primary cognitive habitus that are shared by the Confucian Heritage Culture (CHC) societies. However, both divergence and convergence were found which gave us a new understanding of the characteristics of East Asian learners, their learning strategies and learning environment.*

*Key words: East Asian learners, Programme for International Student Assessment (PISA), learning strategies, school climate, self-related cognition*

## Introduction

From the early international studies led by the International Education Association (IEA) to the most recent Third International Mathematics and Science Study (TIMSS) and the International Programme for Student Assessment (PISA), East Asian nations or administrative entities, notably Japan, Korea, Hong Kong, Taiwan, Macao and Singapore, have consistently ranked in the top tier in these international comparisons of math and science achievement. Researchers have attributed this Asian achievement to factors related to the classroom and teaching practices (Stevenson & Stigler, 1992), intended and implemented curriculum, and the centralized nature of the examination system (Stevenson & Baker, 1996). Rarely has international comparison of student performance using these comparable databases gone beyond these proximate determinants of student achievement to focus on the larger *social contexts* in which learning takes place. This study takes a broader perspective by linking student performance to the socio-economic-cultural context, the schooling environment and the individual characteristics of Chinese learners from an empirical and international comparative perspective.

The purpose of this paper is threefold: First, theories and researches accounting for the spectacular educational successes of these East Asian societies will be reviewed with particular focus on the unique characteristics of learners in Chinese societies. Second, by using data from PISA2000+ and PISA2003, the similarities and differences in the students' ways of learning in four East Asian Societies, the Republic of Korea (hereafter referred to as Korea), Japan, Hong Kong and Macao, will be examined. Finally, convergences and divergences of the learners' characteristics in these four

East Asian societies will be summarized to illuminate the uniqueness of East Asian learners.

## Literature Review

Many studies have attributed the outstanding performance and success of East Asian learners to their cultural model of learning (e.g., Hau & Salili, 1991; Lee, 1996; Li, 2004; Schneider & Lee, 1990; Wong, 2004). A number of researchers attribute it to the *values and aspirations* these students share with their parents (Schneider & Lee, 1990; Shon & Ja, 1982; Yao, 1985), to these students' *motivation* for socioeconomic advancement or self perfection through education (Lee, 1996; Salili, Chiu, & Lai, 2001; Sue & Okazaki, 1990), to *the learning activities at home* (Chen & Stevenson, 1989; Schneider & Lee, 1990; Stevenson and Stigler, 1992), and to the *interactions* these students have with their teachers and classmates *in school* (Hau & Salili, 1991; Schneider & Lee, 1990; Stevenson and Stigler, 1992). These analyses seem to provide a very encouraging picture of the education in East Asian societies. Nevertheless, we need to be aware of the existence of challenges to these findings such as the high participation (mind) but low engagement (heart), doing good but feeling bad phenomena in these Asian societies (Ho, 2006).

The following review will focus on two levels. At the individual level, focus will be on the high educational aspiration, superior motivations to learn, but high anxiety and low self-perception. At the school level, the hybridization of various learning strategies and the contradictory schooling climate will be examined.

### 1. Educational Aspiration

East Asian families place great emphasis on academic achievement. It is commonly perceived that having high academic achievement is a means to honor one's parents and ancestors. Previous studies suggested that Chinese parents were discontented even when the teachers express satisfaction with their children's high achievement. He suggested that Chinese parents demand more learning and emphasize their children's continuous effort to self-improve, regardless of their actual accomplishment (e.g., Shon & Ja, 1982; Yao, 1985). As a result, children study hard to meet the expectation of their parents rather than their own achievement, and

therefore, children generally also have high educational aspirations in East-Asian societies (Schneider & Lee, 1990).

## 2. Anxiety

Education, in conjunction with the examination system, has always functioned as a tool for social mobility, whereby individuals can strive for higher social status. East Asian societies have always had a very strong belief in the positive impact of rigorous testing. However, in the face of the pressure from internal and external examinations, students might be very anxious about their performance. In fact, the Hong Kong curriculum has been criticized for being far too examination-driven, putting too much emphasis on lecturing, memorization, and preparation for in-school and public examinations (e.g., Biggs, 1998; Cheng, 1997; Ho, 2006; Pong & Chow, 2002).

Brown (1994) suggested that there are two types of anxiety — facilitative and debilitative. If experiencing facilitative anxiety, learners may benefit from the tension in order to keep themselves alert and enable them to make the required effort to accomplish a goal. By contrast, learners experiencing debilitative anxiety are unable to relax entirely and their worries may simply make them avoid mistakes, fearing that it might lead to negative social evaluation, and thus avoid challenges due to their low confidence. Such a sequence of behaviour will ultimately hinder student learning. Therefore, it is interesting to examine the extent of test-related anxiety in East Asian societies.

## 3. Self Perception

There are two major traditions in the study of self-perception: self concept and self-efficacy. Self concept is belief about one's competence in general or in a particular domain and self efficacy is belief in one's capacity to execute the courses of action (Bandura, 1997; Marsh, 1990; Skaalvik & Bong, 2003). In brief, self efficacy is more task-specific whereas self-concept is relatively more general although it can be specific to a particular domain.

Previous studies consistently found there to be low self-concept among East Asian learners regardless of their high performance in many international studies (e.g., Hau, Kong, & March, 2003; Ho, 2006). One

possible reason is related to the "big fish little pond effect" (BFLPE). Hau, Kong, and March (2003) argued that students usually use their classmates as a reference group for judging their ability. At the societal level, given the highly academically segregated schooling systems in East Asian societies, Hau, Kong, and March (2003) argued that "being a student in a prestigious school may make one feel good, but the competition with high ability classmates has a much stronger undesirable effect than the desirable effect of studying in prestigious schools and the sum is thus negative" (p. 51). This can be seen as the BFLPE at the societal level under a highly segregated educational system.

Another possible reason is that, in East Asian societies, teachers are generally more demanding (Ho, 2001). They do not easily give high marks or A grades to their students. They will also try to find the students' weaknesses so that there is always room to improve. Teachers from Western culture are more likely to focus on the students' strengths in order to provide positive reinforcement.

## 4. Motivation

Research into achievement motivation distinguishes between two types of motivation: intrinsic and extrinsic motivation. Intrinsic motivation emphasize the internal value of learning such as interest and enjoyment of learning new knowledge whereas extrinsic motivation focuses on the instrumental values such as the practical effect of studying on future career or further study. In fact, placing too much focus on practical aspects of education such as pursuing high marks in an examination may hamper the development of those talented in a subject.

This latter is only partially true for the high-stake testing culture in East Asian societies, since Watkins & Biggs (1996) and Kember (2000) argued that Asian students are motivated by both intrinsic and extrinsic rewards. They pointed out that it was a common misunderstanding that Asian students were motivated solely by a good career offered by the certificate while they lacked the interest in working and studying the materials (e.g., Kember, 2000, pp. 112–114). Wong (2004) also supported that, in CHC regions, learning possesses nurturing goals far beyond clearing examination hurdles and getting a place in the official hierarchy. He suggested that "As said by Confucius himself, 'the purpose of learning in ancient times was for (enriching) oneself and the purpose of learning nowadays is for (pleasing)

others' " [1] (*Analects* 14:24, as cited in Wong, 2004, p. 528). Therefore, the "soul" of CHC education is not only for scores, achievements, and performances but also for self-actualization.

## 5. Learning Strategies

It is generally perceived that the CHC learning environment stresses recitation and memorization, has large classes with passive learners, is teacher-centered, and uses authoritative teachers, and this kind of learning environment is in sharp contrast to what is often found, and generally believed to be conducive to learning (Wong, 2004). Biggs (1996) pointed out that it is a misconception to believe that learners from East Asian societies are taught only by rote learning. He suggested that CHC learners may use rote strategy, but there is no evidence that they memorize any more or any less than their Western counterparts.

In the *Analects*, "Duo wen, ze qi shan zhe er cong zhi; duo jian er shi zhi" [2] (*Analects* 7:28; Confucius, 2006, p. 88) is given the idea of "to obtain knowledge and skills not only from textbooks but also from real life experiences." It appears that learners in Confucian societies are not just good at memorizing knowledge from books but also at active and reflexive thinking, using a spirit of inquiry, and connecting school knowledge to daily life (Chan, 1997; Cheng, 2002; Lee, 1996; Watkins & Biggs, 2001).

For instance, in Chan's empirical study (1997), he compared the learning beliefs and practices of university students from Chinese and Australian cultures. The results do not support the notions that Chinese learners are passive, uncritical, dependent, and rely mainly on a surface, reproductive mode of learning. In contrast to this representation, Chinese learners are highly active, monitoring the studies and learning from their mistakes and linking past experience to their studies. This paper will examine if memorization and elaboration strategies are used equally well in East Asian societies.

## 6. School Climate

CHC classes are typically large, usually over 40, and appear to Western observers as highly top-down in their interaction and teaching with students (Ho, 2001); and their teaching methods appear as mostly expository, sharply focused on preparation for external examination (Biggs, 1996). A number of

previous studies suggested that teachers in typical Chinese schools are considered authorities and superior. Students are taught to respect, obey, listen, and follow their instruction and not to challenge their teachers (Liu, 1986; Salili, 2001). That is, attention and discipline is of first priority in a CHC classroom.

For instance, students have already learnt at a very young age, that one should put up one's hand and be called by name before standing up and speaking. Such "discipline" is not only for students' control but also a means to develop various routines in the flow of classroom teaching: when to talk, when to do seat work, when to open one's book, when to look at the chalk-board, and so on. "Orderly Discipline" is actually an essential part of moral education in East Asian societies. Under such a disciplinary climate, it is likely that students can learn efficiently but they may have more passive and negative feelings towards schools and their sense of belonging might be lowered when compared to the more active schooling climate in the West.

## Database and Data collection

The data from PISA2000+ and PISA2003 are used in this study. In PISA2000+, over 200,000 students from over 6,000 schools in 43 countries/regions participated. In PISA2003, over 250,000 students from over 10,000 schools in 41 countries/regions participated. This paper focuses on the four East Asian societies — Hong Kong, Japan, Korea and Macao.

For data collection, PISA employs a two-stage stratified sampling method, i.e., the sample of students is formed by first selecting a sample of schools, and then selecting a sample of students within each of those schools. The first-stage sampling units consist of schools with 15-year-old students. Schools are sampled systematically with probabilities proportional to size and the measure of size is a function of the estimated number of eligible students enrolled. A minimum of 150 schools is selected in each country/region. The second-stage sampling units are students within sampled schools. Once a school is sampled, a list of 15-year-old students in that school is then generated, in which, 35 students are selected with equal probability. Experts from the PISA Consortium monitor the sampling in each country. The quality standards of sampling have to meet several criteria regarding accuracy and precision, response rates, and sampling methodology.

PISA started in 2000 and takes place every three years. Data are collected using a 2-hour literacy test and questionnaires for students and schools. In the test, students are assessed on their basic literacy in three subject domains, namely, Reading, Mathematics, and Science. Each of the three domains is cyclically treated as a major domain, [3] and the literacy test and background questionnaires will be focused on the major domain in each cycle by having more items. Reading is the major domain from 2000 and Mathematics from 2003. The major constructs of learners characteristics used in this paper were shown in Table 1.

**Table 1 Measures of Major Constructs of Learner Characteristics in PISA**

| | **Sample items in student questionnaire: To what extent do you agree with the following statements?** | **Number of items** | **Reliability (**Cronbach alphas**)** |
|---|---|---|---|
| **Aspiration & Anxiety** | | | |
| Educational aspiration | Six point scale: 1: S3, 2: S5, 3:S5+, 4: S6–S7, 5: S7+ 6: University | 1 | NA |
| Anxiety in Math | I feel helpless when doing a Mathematics problem. | 5 | 0.83 |
| **Self Perception** | | | |
| Mathematics self-concept | I have always believed that Mathematics is one of my best subjects. | 5 | 0.89 |
| Mathematics self-efficacy | How confident do you feel about having to do the following Mathematics tasks? Understanding graphs presented in newspapers. | 8 | 0.87 |
| **Motivation in Mathematics** | | | |
| Interest & enjoyment in Math | I do Mathematics because I enjoy it. | 4 | 0.91 |

| | | | |
|---|---|---|---|
| Instrumental motivation in Math | Learning Mathematics is worthwhile for me because it will improve my career prospects. | 4 | 0.88 |
| **Learning Strategies and Learning Environment** | | | |
| Elaboration strategies | I think how the Mathematics I have learnt can be used in everyday life. | 5 | 0.80 |
| Memorization strategies | To learn Mathematics, I try to remember every step in a procedure. | 4 | 0.58 |
| Competitive learning | I would like to be the best in my class in Mathematics. | 5 | 0.81 |
| Co-operative learning | In Mathematics I enjoy working with other students in groups. | 5 | 0.80 |
| **School Climate** | | | |
| Disciplinary climate in Math lessons | There is noise and disorder. | 5 | 0.88 |
| Attitudes towards school | School helped give me confidence to make decisions. | 4 | 0.65 |
| Sense of belonging to school | I feel like I belong. | 6 | 0.74 |

## Results and Discussions

Using data from PISA2000+ and 2003 studies, this study will address the major conceptions and misconceptions regarding East Asian Learners in the following areas: (1) academic performance, (2) educational aspiration and anxiety, (3) self-concept and self-efficacy, (4) intrinsic and extrinsic motivation, (5) learning strategies and environment, (6) school climate.

### 1. Academic Performance and Aspiration

East Asian students have performed very well in recent international studies including TIMSS and PISA. In PISA2003, Hong Kong, Japan,

Korea, and Macao ranked within the top ten in Mathematics, Science and Problem Solving (see Table 2). The outstanding performance in Mathematics and Science might not be surprising since East Asian countries usually perform very well, as demonstrated in TIMSS1995 and TIMSS1999, but the outstanding performance in Problem Solving, where the four East Asian societies are ranked in the top six, suggests that East Asian learners can really apply what they learn in solving daily life problems.

The assessment of Problem Solving in PISA2003, which emphasized the application of cross-curricular knowledge to solving authentic problems, was expected to be the domain in which learners in East Asian regions were the weakest, especially for the two Chinese societies — Hong Kong and Macao. This good performance gives us a new view of Chinese Learners in that they might not just be good at memorizing data (Watkins & Biggs, 1996, 2001) but they might also be able to apply their knowledge in solving real problems.

## 2. Aspirations and Anxiety

Students in all the four East Asian societies consistently have higher educational aspiration when compared to the Organisation for Economic Co-operation and Development (OECD) average. The particularly high educational aspiration of students nurtured in East Asian societies can be seen as a kind of cognitive habitus — that is, East Asian students are generally willing to put extra effort into study regardless of being in their home town or having emigrated to foreign countries. That is why the performances of immigrant students from East Asian societies are comparable with the native students although they may be disadvantaged in their language and home resources.

Students in all the four East Asian societies consistently have higher anxiety in dealing with mathematics than the OECD average. These findings suggested that some traditional features still persist with the high stakes examinations in the four societies which might increase student anxiety towards learning even when they are outstanding in the actual academic achievement (see Table 3). These findings are consistent with previous research that East Asian students were more fearful of tests and assessment and were less confident in their school skills than were the children from the United States (e.g., Biggs, 1998; Cheng, 1997; Ho, 2006; Pong & Chow, 2002)

**Table 2 Mean Performance of 15-Year-Olds in the Top Ten Countries in PISA 2003**

| **Mathematical Literacy** | | | **Reading Literacy** | | | **Scientific Literacy** | | | **Problem Solving** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Country*** | ***M*** | ***SE*** | ***Country*** | ***M*** | ***SE*** | ***Country*** | ***M*** | ***SE*** | ***Country*** | ***M*** | ***SE*** |
| **Hong Kong** | **550** | **(4.5)** | Finland | 543 | (1.6) | Finland | 548 | (1.9) | **Korea** | **550** | **(3.1)** |
| Finland | 544 | (1.9) | **Korea** | **534** | **(3.1)** | **Japan** | **548** | (4.1) | **Hong Kong** | **548** | **(4.2)** |
| **Korea** | **542** | **(3.2)** | Canada | 528 | (1.7) | **Hong Kong** | **539** | **(4.3)** | Finland | 548 | (1.9) |
| Netherlands | 538 | (3.1) | Australia | 525 | (2.1) | **Korea** | **538** | **(3.5)** | **Japan** | **547** | **(4.1)** |
| Liechtenstein | 536 | (4.1) | Liechtenstein | 525 | (3.6) | Liechtenstein | 525 | (4.3) | New Zealand | 533 | (2.2) |
| **Japan** | **534** | **(4.0)** | New Zealand | 522 | (2.5) | Australia | 525 | (2.1) | **Macao** | **532** | **(2.5)** |
| Canada | 532 | (1.8) | Ireland | 515 | (2.6) | **Macao** | **525** | **(3.0)** | Australia | 530 | (2.0) |
| Belgium | 529 | (2.3) | Sweden | 514 | (2.4) | Netherlands | 524 | (3.1) | Liechtenstein | 529 | (3.9) |
| **Macao** | **527** | **(2.9)** | Netherlands | 513 | (2.9) | Czech Republic | 523 | (3.4) | Canada | 529 | (1.7) |
| Switzerland | 527 | (3.4) | **Hong Kong** | **510** | **(3.7)** | New Zealand | 521 | (2.4) | Belgium | 525 | (2.2) |

**Table 3 Educational Aspiration and Anxiety of East Asian Societies**

| | Hong Kong | Macao | Japan | Korea |
|---|---|---|---|---|
| Educational aspiration | 4.04 | 4.00 | 4.09 | 4.68 |
| Anxiety in Math | 0.22 | 0.23 | 0.44 | 0.42 |

## 3. Self-concept and Self-efficacy

Students in all the four East Asian societies consistently have lower self-concept than the OECD average. These findings are in line with many previous studies (e.g., Hau, Kong, & March, 2003; Ho, 2006). Although East Asian students do very well academically, their confidence is always much lower than students of many other countries who are not doing so well. The findings for the underestimations of the self ability of CHC students had been explained by the "big fish small pond" hypothesis. Another interpretation given by Yu (1996) is that, the use of Western instruments to measure self-concepts in Chinese societies on the ground that these instruments fail to capture the social components of the self in such societies.

Findings from the present study suggest that self-efficacy is not as low as self-concept for the students in Hong Kong and Macao. Both these two societies have a positive value on the index of self-efficacy which indicated that Chinese students are quite positive when self-evaluating their ability to solving particular mathematics tasks or problems. This is in contrast to Korea and Japan, in which both self-concept and self-efficacy are far below the OECD average of zero (see Table 4). Further ethnographic studies are needed to understand these interesting differences. One possible explanation is that Japanese and Korean learners remain humble and avoid arrogance following the traditional CHC. Hong Kong and Macao, the two post-colonized Chinese societies, might have absorbed some Western styles of parenting and schooling which may have had a positive influence on the tasks-specific self-perception of self-efficacy.

**Table 4 Self-concept and Self-efficacy of East Asian Societies**

| | Hong Kong | Macao | Japan | Korea |
|---|---|---|---|---|
| Self-concept in Math | −0.25 | −0.21 | −0.53 | −0.36 |
| Self-efficacy in Math | 0.14 | 0.09 | −0.53 | −0.43 |

## 4. Intrinsic vs. Extrinsic Motivation

Evidence from PISA2003 suggested that students from Hong Kong and Macao have higher intrinsic motivation and lower extrinsic motivation than the OECD average. This finding challenges the argument of Watkins and Biggs (1996) and Kember (2000) that Asian students are motivated by both intrinsic and extrinsic rewards. In other words, the learners in the two Chinese societies in the present study tend to be motivated by their own interest in the subject rather than by the instrumental value of further studies and career reasons. For Korea and Japan, both intrinsic and extrinsic motivations are far below the OECD average (see Table 5).

Consistent with Lee's argument (1996) self-improvement and perfection is the major motivational factor for learning in Chinese learners. The findings in PISA2000 and PISA2003 paint us a new picture, showing that East Asian Learners do not have similar pattern of motivation and that learners in the two Chinese societies appear to have a relatively higher level of intrinsic motivation in learning Mathematics than Japanese and Korean learners.

**Table 5 Intrinsic and Extrinsic Motivation of East Asian Societies**

| | Hong Kong | Macao | Japan | Korea |
|---|---|---|---|---|
| Intrinsic motivation | 0.23 | 0.11 | −0.39 | −0.13 |
| Extrinsic motivation | − 0.12 | − 0.04 | −0.66 | −0.44 |

## 5. Learning Strategies and Learning Environment

### *Memorization and Elaboration*

There is a general view of East Asian learners that they tend to be passive and concentrate more on memorization compared with their Western counterparts who tend to value active learning and place more emphasis on elaboration (e.g., Gow, Balla, Kember, & Hau, 1996). Another interpretation given by Biggs (1996), Chan (1997); Lee (1996) and Watkins and Biggs (2001) is that memorization and elaboration are not mutually exclusive in learning, and that Asian learners are not necessarily passive, uncritical, dependent, and reliant mainly on a surface, reproductive mode of learning. They can be highly active and connect their study with the past knowledge and daily life experience

Evidence from Table 6 suggested that students from all the four East Asian societies cumulatively used memorization strategies even less than the OECD average. More interesting is that the level of elaboration strategy used by students from Hong Kong and Macao is similar to the OECD average whereas Japan and Korea are below the OECD average. This result suggested that learners in Hong Kong and Macao are connecting their knowledge to real life experience as those in OECD countries. However, Japan and Korea are low in both memorization and elaboration indicating that their students neither learn by going through mathematics examples repeatedly or by connecting mathematics to everyday life. Some other learning strategies that might be used more frequently in Korea and Japan were not captured in the PISA measures should be explored and examined in future studies.

### *Competitive vs. Cooperative Learning Environment*

Students in Hong Kong reported levels of competitiveness that are slightly above the OECD average but their level of cooperative learning is found to be slightly below the OECD average. This might be related to the relatively high academic segregation across schools in Hong Kong. That is, students feel that they must perform better than other students to compete for a place in an elite class (many schools stream their best students into classes according to their academic performance in the previous year) and also compete with students from other schools for a better chance of further studies by success in public examination. This pattern is different from that of Macao where students' level of competitiveness is about the OECD

average and the level of cooperative learning is above the OECD average. This might be related to the low academic segregation between students in Macao by comparison with the other three East Asian societies. Surprisingly, for Japan and Korea, much lower levels of both competitive and cooperative learning than the OECD average were reported by students (see Table 6).

Overall, the competitive and cooperative environment in Japan and Korea is far below the OECD average, whereas these environments in Hong Kong and Macao are more comparable to the OECD average. One possible reason is that both Hong Kong and Macao are post-colonial societies in which the educational systems are both more westernized under the influences of education reform from The United Kingdom and Portugal respectively. As a result of the hybridization of Asian learning culture and Western teaching strategies, the two Chinese societies are more similar to the international norms in their learning process.

**Table 6 Learning Strategies and Learning Environment of East Asian Learners**

| | Hong Kong | Macao | Japan | Korea |
|---|---|---|---|---|
| Memorization strategies | −0.15 | −0.05 | −0.57 | −0.35 |
| Elaboration strategies | 0.01 | 0.05 | −0.75 | −0.40 |
| Competitive learning | 0.11 | 0.03 | −0.48 | −0.06 |
| Co-operative learning | −0.02 | 0.14 | −0.72 | −0.78 |

## 6. School Climate

As indicated in Table 7, the disciplinary climate reported by students in the four East Asian societies is generally more positive than the OECD average. This pattern is consistent with previous observation of the classroom comparing Asia and United States (Liu, 1986; Salili, 2001; Stevenson & Stigler, 1992). However, results from the second and third rows of Table 7 suggests that, attitudes towards school and sense of belonging to schools of the four East Asian societies are far below the OECD average. Wilson (1974) suggested that the common use of shaming in Asian home and school led to the development of strong internalized control, conformity and reluctance to express hostility towards authority explicitly in classroom and in school. It is not surprising to see from the

evidence of PISA 2003 that students in these four East Asian societies reported negative attitudes towards school and extremely low sense of belonging to schools.

**Table 7 Teaching and Learning Environment of Four East Asian Societies**

| | Hong Kong | Macao | Japan | Korea |
|---|---|---|---|---|
| Disciplinary climate in Math lessons | 0.17 | 0.08 | 0.44 | 0.11 |
| Attitudes towards school | −0.52 | −0.36 | −0.50 | −0.37 |
| Sense of belonging to school | −0.60 | −0.62 | −0.53 | −0.40 |

## Conclusions and Implications

The evidence which emerged from PISA supported the notion that the four East Asian societies share some common strengths and weaknesses at the social, institutional and individual levels. Yet, within that convergence, divergent characteristics emerged under close scrutiny of the evidence from the first two cycles of PISA.

As summarised in Table 8, certain aspects of converging characteristics among the East Asian learners were found. First, at the institutional level, school climate is very consistent across the four societies. The disciplinary climates are consistently much more positive than the OECD average. Yet, students consistently have more negative attitude towards school and a much lower level of sense of belonging to school than the OECD average. As a result, winning students' heart and soul is a common problem for educators in all these East Asian entities. Second, at the individual level, all four East Asian societies perform very well both in traditional subjects including mathematics and science and in the cross-curriculum domain — problem solving. These findings challenge the perception that Asian learners are "rote learners" who can only drill for traditional tests. Evidence in PISA suggested that they can apply their knowledge to solve daily life problems. Third, the learners across the four East Asian societies have consistently high educational aspirations. Yet, East Asian learners also consistently have low self-concept which appears to be paradoxical in the light of their outstanding performance.

**Table 8 Convergences and Divergences of Student Characteristics in the Four Asian Societies**

| | Hong Kong | Macao | Japan | Korea | Compared with OECD |
|---|---|---|---|---|---|
| | | ***Convergences*** | | | |
| **School Climate** | | | | | |
| Disciplinary climate | H | H | H | H | D |
| Attitude towards school | L | L | L | L | D |
| Sense of belonging to school | L | L | L | L | D |
| **Achievement, Aspiration and Self-concept** | | | | | |
| Achievement in literacy | H | H | H | H | D |
| Education aspiration | H | H | H | H | D |
| Self-concept in Math | L | L | L | L | D |
| | | ***Divergences*** | | | |
| **Learning strategies and learning environment** | | | | | |
| Memorization Strategies | M | M | L | L | S/D |
| Elaborative strategies | M | M | L | L | S/D |
| Competitive learning | M | M | L | L | S/D |
| Cooperative learning | M | M | L | L | S/D |
| **Anxiety and Self-efficacy** | | | | | |
| Anxiety | M | M | H | H | S/D |
| Self-efficacy in Math | M | M | L | L | S/D |
| **Motivation** | | | | | |
| Intrinsic motivation to Math | M | M | L | L | S/D |
| Extrinsic motivation to Math | L | L | L | L | D |

Note: H: Higher than the OECD average
M: Similar to the OECD average
L: Lower than the OECD average
S: Similar to OECD
D: Different from OECD

Nevertheless, several divergent characteristics in the four East Asian societies also emerged. First, Japan and Korea are relatively low in all the four indices of learning strategies. Yet students in Hong Kong and Macao are average in two of them, elaboration strategies and memorization strategies. Students of Hong Kong and Macao also reported a slightly higher preference for competition and cooperative learning environment than students of Japan and Korea. It appears that the learners in these two Chinese societies might be more receptive to kinds of learning strategies and learning environment as measured in PISA. However, for Japan and Korea, PISA did not capture the nature of learning strategies and learning environment that is worth for future studies. Second, learners from Hong Kong and Macao have a moderate level of anxiety and efficacy whereas those in Japan and Korea have relatively high level of anxiety and low level of efficacy.

Finally, learners from Hong Kong and Macao are moderately motivated by intrinsic-interest in the subject but not so much by extrinsic-instrumental rationales. These new findings challenged the previous assumption that learners in Chinese societies are more instrumental and mainly motivated by external factors such as further studies or future careers. Japanese and Korean students reported lower levels of intrinsic and extrinsic motivation than the average reported for OECD countries. Again, the measure of individualized motivation in PISA might not capture the collective dimension of motivation, where students are motivated to learn for the honor of family in these CFC societies.

In sum, learners in East Asian regions in the present study share similar strengths in terms of the high achievement, high aspiration, and orderly disciplinary climate in school. They also share the common problems of low self-concept and disengaged learning climate. This can be seen as the primary cognitive habitus of CHC societies, the habitus or disposition basically nurtured by similar culture. Divergent characteristics between the learners between the two Chinese societies, and Japan and Korea, such as the different level of intrinsic motivation for learning, different extent of using memorization and elaboration strategies, different level of acceptance of competitive and cooperation learning environment, different level of anxiety and efficacy in mathematics education, provide us with a deeper understanding of the kinds of variations in the variety of educational contexts. This might be the secondary cognitive habitus emerged from the different level of hybridization of traditional CHC ways of learning and Western ways of teaching in the four East Asian Societies.

Finally, several limitations of this paper are note-worthy. First, the analysis is limited by the data available from PISA2000+ and PISA2003. Therefore, the findings about the learners' characteristics of the two Chinese societies in the present study are only tentative. Several countries from East Asian societies, such as Mainland China, Taiwan, and India did not participate in the first two cycles of PISA study, that have limited the generalizability of this study. To improve the generalizability, similar analysis could be conducted when data from other East Asian societies are available in future cycles of PISA, or from other international studies, such as TIMSS and PIRLS (Progress in International Reading Literacy Study).

Moreover, this study found that there are similarities of the learners within the four East Asian societies (the primary habitus), yet there are cross-regional differences (the secondary habitus). Further research is needed to examine how and why the "secondary cognitive habitus" emerged in the East Asian societies which distinguished the two Chinese societies from Japan and Korea. Historically, most of the educational practices of the East Asian societies were greatly influenced by the West (Wong, 2009). To what extent and how the "secondary cognitive habitus", such as motivation, learning strategies, learning environment preferences, anxiety and efficacy for learning, related to the ways and degree of adoption of Western ways of teaching is worthwhile for future studies. As Wong (2009) pointed out, East-West differences can be found at the teaching level although the curriculum might be blurring. The same might be true at the parenting level, where parents in the two post-colonial Chinese societies might be more influenced by the Western liberal parenting style, which might also affect the children's self-cognition towards learning. Further, to enrich our understanding of the convergent and divergent characteristics of learners from East Asian societies, other system level factors such as streaming and tracking within schools, high-stake testing and examination, social and academic segregation among schools within each of these East Asian societies should be examined in future studies.

## Notes

1. 「古之學者為己，今之學者為人」（《論語・憲問》）。
2. 「多聞，擇其善者而從之，多見而識之」（《論語・述而》）。
3. Additionally, in PISA 2003, a new subject domain Problem Solving has once been introduced to assess students' cross-curricular competencies in solving problems in real-life situations.

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