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ABSTRACT

The recent educational reform in Hong Kong has emphasized students' learning to learn. To facilitate the ability of learning to learn, students need to: trust their own capabilities; like academic work; be intrinsically motivated such that they are task and effort oriented; be ready to broaden their knowledge and skills by reading and exploring; be flexible in their learning behavior; and be able to work independently. This study investigated these abilities among students in fourth and fifth grades in Hong Kong, to examine potential gender and grade level differences in these constructs. A sample of 59 boys and 64 girls in grade 4 and 96 boys and 97 girls in grade 5 from 20 schools responded to a surveyed. The survey asked them about self-concepts of competence and affect, task and effort orientations in school motivation, willingness to broaden knowledge and skills, and flexibility and independence in learning. Principal component analysis established the seven factors. Analysis of variance found that although boys and girls did not differ in their self-concept of competence, girls excelled in 5 of the other 6 variables. There was a gender x grade interaction effect for broadening knowledge, indicating that whereas 5th grade girls were more willing that 4th grade girls to broaden their knowledge through reading, 5th grade boys were less willing that 4th grade boys to do so. Advocates of education reform need to seriously consider gender differences when formulating policies in relation to promoting learning to learn in schools. (Scales in the study and their reliability are appended. Contains 44 references.) (Author/HTH)

# Gender Differences in Learning to Learn: Self-Concepts, Motivation and Learning Inclinations of Hong Kong Grades 4 and 5 Students.

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February 7, 2003

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Paper presented at the Asia Pacific Conference of Education. Re-envisioning Education: Innovation and Diversity at the National Institute of Education, Nanyang Technological University, Singapore in June 2003. The author thanks Rachel Y. H. Hon for constructive comments on earlier versions of this paper. Enquiries concerning this paper should be directed to Alexander S. Yeung, Division of Continuing Professional Education, The Hong Kong Institute of Education, 10 Lo Ping Road, Tai Po, N.T., Hong Kong or via email to ssyeung@ied.edu.hk

**Abstract**

The recent educational reform in Hong Kong has emphasized students' learning to learn. To facilitate the ability of learning to learn, students need to trust their own capabilities, they need to like academic work, be intrinsically motivated such that they are task and effort oriented, be ready to broaden their knowledge and skills by reading and exploring, be flexible in their learning behavior, and be able to work independently. A sample of 59 boys and 64 girls in grade 4 and 96 boys and 97 girls in grade 5 in 20 primary schools in Hong Kong responded to a survey asking them self-concepts of Competence and Affect, Task and Effort orientations in school motivation, willingness in Broadening knowledge and skills, Flexibility and Independence in learning. Principal components analysis established the seven factors. Analysis of variance found that although boys and girls did not differ in their self-concept of competence, girls excelled in 5 of the other 6 variables. There was a gender x grade interaction effect in Broadening, indicating that whereas 5th grade girls were more willing than 4th grade girls to broaden their knowledge through reading, 5th grade boys were less willing than 4th grade boys to do so. Advocates of education reform need to seriously consider gender differences when formulating policies when promoting learning to learn in schools.

The recent educational reform in Hong Kong has emphasized students' lifelong learning and the development of capabilities in learning to learn (Curriculum Development Council, Hong Kong, 2001; Hong Kong Institute of Education, 2000). To facilitate the ability of learning to learn, students need to trust their own capabilities, they need to like academic work, be intrinsically motivated such that they are task and effort oriented, be ready to broaden their knowledge and skills by reading and exploring, be flexible in their learning behavior, and be able to work independently. This paper investigates these abilities of a sample of primary school students in 4th and 5th grades in Hong Kong. The focus is to examine potential gender and grade level differences in these constructs. The results will have important implications for formulating policies and designing programs for promoting learning to learn in schools.

Self-concepts of Competence and Affect

For students to develop capabilities in learning to learn, students need to trust their own capabilities and they need to like academic work. In essence, students need to have a positive self-concept both about their own ability and their liking of schoolwork before they can work independently. Self-concept in schoolwork is not only an important educational outcome in itself, but it is also an important factor that contributes to other valuable educational outcomes (Marsh, 1993). Numerous studies have shown that a positive academic self-concept may contribute significantly to academic achievement and academic behavior (e.g., Chapman & Tunmer, 1995, 1997; Eccles & Wigfield, 1995; Helmke & van Aken, 1995; Marsh & Yeung, 1997a, 1997b; Muijs, 1997; Wigfield & Eccles, 1992; Yeung & Lee, 1999). Self-concept is of particular importance when the recent focus of the educational reform is on developing students' ability to learn how to learn by themselves. It will be hard to imagine how a child can learn to learn independently without a positive self-concept of his or her competence in schoolwork. It will be similarly hard to envisage any successful independent learning if the student does not like schooling.

Recent research findings on self-concept have led to the advancement of theory and refinement of instruments (e.g., Marsh, 1987, 1990, 1992, 1993; Marsh & O'Neill, 1984; also see Byrne, 1996 for a review), and the emphasis of self-concept enhancement in most educational programs. Since Shavelson, Hubner, and Stanton's (1976) proposal of a theoretical model of self-concept, researchers have emphasized a multidimensional approach to the study of self-concept. Of particular relevance to the present study is the study by Marsh, Craven, and Debus (1999) who distinguished between self-concepts of competence and affects. According to Marsh et al. (1999), although these two dimensions of self-concept tend to be very closely associated, a distinction between them may provide us with some valuable information when investigating students' academic self-concepts. Thus for example, although most students would tend also to like schooling if they do well at school, some other students may like going to school but do not feel good about their competence in schoolwork. Nevertheless, in the context of developing a learning-to-learn capability, both self-concepts of competence and affect are probably crucial dimensions.

Mastery Goals in School Motivation

Like self-concept, motivation in academic pursuit may also be a crucial factor that contributes to the ability in learning to learn. Indeed, students' academic behaviors have been found to be associated with their motivation in schoolwork (Ames, 1992; Dweck, 1989; Lepper & Hodell, 1989; McInerney, Roche, McInerney, & Marsh, 1997; Pintrich & Maehr, 1995; Pintrich, Marx, & Boyle, 1993; Wentzel, 1998). It would be hard to imagine that a student would learn to work independently without a positive school motivation.

Whereas traditional models of school motivation distinguished between intrinsic and extrinsic motivation (Deci & Ryan, 1985; Dweck, 1989; Lepper & Hodell, 1989; Spaulding, 1992), more recent models of school motivation examine the goal orientations of students.

Goals are cognitive representations of students' purposes in different achievement situations. They are assumed to guide students' behavior, cognition, and affect in their academic work (Ames, 1992; McInerney, 1995; Pintrich, Marx, & Boyle, 1993; Wentzel, 1991). Thus, goal orientations play an important role in directing behavior toward outcomes that individual students would like to achieve and may explain reasons for students' desire to achieve in academic work (Ames, 1992, Ford, 1992; Pervin, 1983; Wentzel, 1998).

Like self-concept, goal theory takes on a multidimensional approach in describing students' orientations in academic motivation. According to Wentzel (1998), mastery goal orientations represent "desires to achieve outcomes derived from the actual process of learning" (p. 202). Performance goal orientations represent "desires to achieve outcomes derived from personal expectations or values associated with the consequences of task engagement" (Wentzel, 1998, p. 202). Hence, performance goals are essentially "other-referenced" whereas mastery goals are based on the belief that academic effort leads to success, and that learning has intrinsic values (McInerney, Yeung, & McInerney, 2001). Researchers have suggested that mastery goals are vital for students' desirable academic behavior, attitude, and achievement of academic outcomes (e.g., McInerney et al., 2001; Wentzel, 1998). A mastery goal orientation is thought to be associated with feelings of satisfaction and competence and the joy of investing an effort in the process of learning. For students to be able to learn by themselves and persevere in schoolwork, it will be important for them to take on a mastery goal. The present study therefore focuses on the mastery orientations in school motivation.

McInerney et al. (2001) proposed two constructs, viz., task and effort, pertaining to the mastery orientation. Consistent with traditional thinking that has emphasized "intrinsic" motivation, we may expect that mastery orientations should be significant factors for students' development of a learning-to-learn ability. The present study therefore used McInerney et al. (2001) instrument to examine primary students' task and effort orientations.

Broadening of Knowledge and Skills

Apart from positive self-concepts and mastery goals of academic orientation, a vital factor that may contribute to students' ability in learning to learn is probably an eagerness to broaden their knowledge and skills. This may include a strong interest in reading different types of printed matter. The Education Department of Hong Kong thus proposed, in the educational reform, an emphasis of schools on students' "reading to learn" (Curriculum Development Council, Hong Kong, 2001). Successful implementation of a reading-to-learn policy would envisage an increase of both boys and girls' eagerness in broadening their knowledge and skills through reading.

Flexibility in Learning

The learning-to-learn proposal in the educational reform is in essence a clear shift from an emphasis on teaching to an emphasis on students' learning. This shift also inevitably requires students to exercise their own judgment and flexibility in handling and monitoring

their own work. When faced with a problem in academic work, with a curriculum that emphasizes on "learning to learn" (Curriculum Development Council, Hong Kong, 2001), a student should try to use different thinking and problem-solving techniques and should accept the fact that a single problem could be solved in a dozen ways. It would be hard to imagine how students can learn to learn without exercising a fair degree of flexibility to bear with changes in their original work plans and to make appropriate adaptations whenever necessary. This kind of flexibility in learning should also be expected to improve as the students grow up.

Independence in Learning

Independence is probably the essence of the "learning-to-learn" proposal of the Curriculum Development Council, Hong Kong (2001). In fact, the abilities to search for relevant information for completing assignments, to monitor and self-evaluate one's own progress, to manage one's time of play vs. time of study, and to tackle problems by oneself probably characterize one's ability to work independently. The ability to work independently should be expected to continually improve as the students proceed through the stages of primary and secondary schools.

Gender and Age Differences

Gender differences have been found in various areas of learning. For example, Yun (2001) examined gender differences in academic self-concept, self-esteem, and academic motivation among high-ability Chinese adolescents. Yun suggested that adolescent girls tend to have higher self-perceptions of verbal ability than boys, and adolescent boys tend to have higher self-perceptions of ability in mathematics. There was evidence of gender difference in self-concept.

Widaman, MacMillan, Hemsley, Little and Balow (1992) examined the self-concept of 1,140 eighth graders from southern California using a general self-concept score and 10 domain scores of the Self-Description Questionnaire II (SDQII; Marsh, 1992). In the study, males obtained significantly higher scores than females on general self-concept, emotional stability, parent relations, physical ability, physical appearance, and opposite-sex peer relations, whereas females obtained significantly higher scores than males on reading, same-sex peer relations, and honesty/trustworthiness. There was further evidence of gender differences in self-concept.

Apart from gender differences, it seems that the self-concept of both sexes may also change over time. Watkins and Dong (1997) investigated age and gender differences in a sample of 303 male and 296 female children 10 years of age and 116 male and 116 female 13-year-old children attending typical Beijing public schools. Using the Self-Description Questionnaire I (SDQ-1; Marsh, 1988) that was designed for younger children, they found that whereas the children tended to have more positive self-perceptions on most nonacademic self-concept scales, both the older boys and older girls reported less favorable self-esteem than their younger peers on the scales for reading and school in general. There was therefore

evidence of age differences suggesting that there seemed to be a general decline in self-concept when children grew up.

The gender differences found in boys and girls and their differences in actual academic achievement have become a serious concern of educators and policy makers. Recent studies seem to have shown that girls are, and may continue to, doing better than boys in elementary and high schools. For example, Marsh and Yeung (1998) found that girls in the schools in USA had higher scores for English and mathematics but they had lower math self-concepts than did boys. They also found that whereas there were diminishing gender differences in the past two or more decades, there were also relative gains for girls in achievement for both English and mathematics. Studies in self-concept and motivation have also found differences between boys and girls at school.

Researchers and policy makers worldwide are probably concerned about the low achievement of boys and are looking for ways to improve the situation. Further complicating the issue are also philosophical implications such as equal opportunities of schooling and practical issues as to what should be done to handle such gender differences. In fact, a recent lawsuit in Hong Kong has led to a heated debate on whether boys and girls from primary schools should be placed into secondary schools by a fixed gender ratio or purely by merit (Hau, 2001). Currently, student in primary 6 ($6^{th}$ grade) are categorized into three bands with band 1 being the highest and band 3 being the lowest in achievement. Is a girl being discriminated if she is not admitted to a good school purely because the gender ratio does not allow a school to be oversubscribed with band 1 girls? Are the boys being discriminated if the curriculum does not allow boys to excel to the limits of their capabilities so as to achieve band 1 performance? In an era when students need to develop self-learning capabilities, to facilitate boys to learn how to learn, we should examine also those crucial driving forces such as self-concept and mastery goal orientations, and the abilities and traits such as the willingness to broaden one's knowledge and skills, and the flexibility and independence in self-learning. Since we may expect boys to differ somewhat from girls in these constructs, the present study examines potential gender differences that may have important implications for policy makers and curriculum designers.

## Method

### The Participants

The participants were 316 primary school students from 20 primary schools in Hong Kong. Of the respondents, 59 male and 64 female students were in grade 4, and 96 male and 97 female students were in grade 5 (age ranging from 10 to 11). All students were Cantonese-speaking Chinese. Most of them were from working-class families. Although all the schools were Christian schools, the students participating in the present study had various religious backgrounds.

### The Instrument

A total of 24 survey items were used to form seven main scales:

- Self-concept of competence. Five items adapted from Marsh, Craven, and Debus (1999) asked the students whether they were satisfied with their academic results, how well they learned in their schoolwork, and how good they believed they were.
- Self-concept of affect. Four items adapted from Marsh, Craven, and Debus (1999) asked the students whether they liked schooling and whether they felt happy going to school.
- Task orientation. Three items adapted from McInerney et al. (1997) asked the students how much they cared about their progress and whether they would hope for improvement.
- Effort orientation. Three items adapted from McInerney et al. (1997) asked the students whether they would invest an effort in learning new knowledge, in solving study problems, and work hard to improve themselves and to maintain a sustained interest in schoolwork.
- Broadening. Three items were designed to ask the students whether they liked to read books and whether they explored new knowledge.
- Flexibility. Three items were designed to ask the students whether they would try to use various thinking and problem-solving strategies when faced with a problem and be flexibility enough to handle different situations.
- Independence. Three items were designed to ask the students whether they would be able to search for relevant information for completing assignments, to monitor and self-evaluate their own progress, to manage time, and to tackle problems by themselves.

The items pertaining to each scale are listed in Appendix where respective reliabilities are also reported.

Statistical Analysis

The participants responded to the items on a 6-point scale (1 = strongly disagree; 6 = strongly agree). Preliminary analysis included alpha estimates of internal consistency for each scale to test their reliability and inter-scale correlations to test their validity to the present sample. Principal components analysis was used to establish the distinctiveness of the seven scales. When the scales were established, we then conducted further analysis with the mean scale scores of students in the seven subscales (i.e., Competence, Affect, Task, Effort, Broadening, Flexibility and Independence). The major focus of the present study was to test the effects of grade level and gender on the seven scales as dependent variables. Specifically, a multivariate analysis of variance (ANOVA) was conducted using the scale means and examined the univariate F-statistics to examine the main effect of gender (i.e., differences between male and female students), the main effect of grade (i.e., differences between $4^{th}$ and $5^{th}$ grade students) and gender x grade effects (i.e., whether differences between $4^{th}$ and $5^{th}$ grade students were consistent between boys and girls). The dependent variables were Competence, Affect, Task, Effort, Broadening, Flexibility and Independence. All statistical

analysis was conducted with the SPSS10 (Foster, 2001; Green, Salkind, & Akey, 2000) statistical tool.

## Results

Reliability and Factor Analysis

The alpha reliability of each scale was reasonably good ( $\alpha$ s = .82, .74, .68, .71, .77, .70, and .68 respectively for Competence, Affect, Task, Effort, Broadening, Flexibility and Independent (see Appendix). We conducted a principal components analysis with the nine self-concept items using varimax rotation. The two a priori factors (Competence and Affect) were extracted. The factor loadings were .55, .63, .80, .83 and .82 for Competence and .84, .63, .81, and .64 for Affect. Similarly, we conducted a principal components analysis with the six motivation items. Two factors (Task and Effort) were extracted as expected. The factor loadings were .88, .75, and .51 for Task and .73, .76, and .73 for Effort. For the remaining nine items, three learning-to-learning scales (Broadening, Flexibility and Independent) were extracted. The factor loadings were .81, .83, and .65 for Broadening, .73, .77, .63 for Flexibility and .69, .78, and .67 for Independent Learning.

The correlations among the seven scales are showed in Table 1. The results show that the correlation coefficients among the seven factors were all low to medium (from .34 to .68), indicating that the variables could be distinguished from one another.

Table 1. Correlations Among Seven Factors

| | Competence | Affect | Task | Effort | Broadening | Flexibility | Independent |
|---|---|---|---|---|---|---|---|
| Competence | -- | | | | | | |
| Affect | .35** | -- | | | | | |
| Task | .34** | .48** | -- | | | | |
| Effort | .51** | .45** | .51** | -- | | | |
| Broaden | .40** | .51** | .46** | .53** | -- | | |
| Flexibility | .52** | .45** | .50** | .68** | .50** | -- | |
| Independent | .48** | .35** | .41** | .55** | .49** | .55** | -- |

**p < .001.

Analysis of variance (ANOVA)

The scores of items for each scale were averaged to form mean scale scores. The mean scores and standard deviations for each for the seven scales are presented by grade and by gender in Table 2. The mean scores show that in general, boys and girls in 4th and 5th grades had reasonably favorable self-perceptions in all seven constructs (the lowest M > 3.5 on a 6-point scale). Multivariate analysis of variance (ANOVA) was conducted to examine the main effects of gender and grade, and the gender x grade interaction. The univariate F-statistics are presented in Table 3.

Table 2. Means and (Standard Deviations) of Variables by Grade and Gender

| | | 4th Grade | | 5th Grade | |
|---|---|---|---|---|---|
| | | Boys | Girls | Boys | Girls |
| Variable | | (n=59) | (n=64) | (n=96) | (n=97) |
| Competence | M | 4.06 | 3.96 | 3.78 | 4.03 |
| | SD | (0.96) | (0.92) | (1.05) | (0.98) |
| Affect | M | 4.59 | 4.67 | 4.07 | 4.59 |
| | SD | (1.09) | (1.02) | (1.25) | (1.00) |
| Task | M | 5.00 | 5.16 | 4.77 | 5.17 |
| | SD | (1.01) | (0.80) | (1.20) | (0.81) |
| Effort | M | 4.58 | 4.77 | 4.22 | 4.69 |
| | SD | (0.93) | (0.92) | (1.21) | (0.85) |
| Broadening | M | 4.40 | 4.44 | 3.73 | 4.80 |
| | SD | (0.94) | (1.24) | (1.51) | (0.97) |
| Flexibility | M | 4.74 | 4.81 | 4.43 | 4.78 |
| | SD | (0.94) | (0.86) | (1.13) | (0.90) |
| Independence | M | 4.28 | 4.37 | 3.73 | 4.32 |
| | SD | (1.12) | (1.09) | (1.15) | (1.06) |

Note: N = 316. Students responded to a 6-point scale with higher scores reflecting more favorable responses.

Table 3. Summary of F-Statistics for ANOVA

| Variable | Gender | Grade | Gender x Grade |
|---|---|---|---|
| Competence | 0.42 | 0.73 | 2.40 |
| Affect | 5.40* | 5.70* | 3.05 |
| Task | 6.24* | 1.00 | 1.09 |
| Effort | 8.23* | 3.41 | 1.50 |
| Broadening | 15.84** | 1.28 | 13.41** |
| Flexibility | 3.34 | 2.12 | 1.57 |
| Independence | 7.03* | 5.43* | 3.86 |

Note: Univariate F-tests had a df of (1, 312). * $p < .05$. ** $p < .001$.

ANOVA results found statistically significant main effects of gender in the scales of Affect, Task, Effort, Broadening, and Independence, $Fs(1,312) = 5.40, 6.24, 8.23, 15.84$, and 7.03 respectively, all $ps<.05$. The mean scores for these dependent variables were 4.62, 5.17, 4.72, 4.76, 4.66, and 4.34 respectively for girls and 4.27, 4.86, 3.93, 4.36, 4.55 and 3.94 respectively for boys. These results show that except for self-concept of competence where no significant gender difference was found, girls scored significantly higher than boys in these variables.

In examining the main effects of grade level, the results show statistically significant differences between 4th and 5th grades in Affect and Independence, $Fs(1,312) = 5.70$ and 5.43 respectively, $ps<.05$. The mean scores on Affect were 4.63 for 4th grade and 4.33 for 5th grade and the mean scores on Independence were 4.32 for 4th grade and 4.03 for 5th grade, indicating that 5th grade students scored significantly lower than 4th grade students in these two measures.

Across the seven scales examined here, a statistically significant gender x grade interaction was found only in the Broadening variable, $F(1,312) = 13.41$, $p<.001$, reflecting that whereas girls did not differ in their scores in 4th and 5th grades (Ms = 4.37 and 4.32 respectively), their male counterparts displayed a lower score in 5th grade (M = 3.73) than in 4th grade (M = 4.28).

## Discussion

The present study investigated the self-perceptions of 4th grade and 5th grade boys and girls in Hong Kong in seven scales that may be critical for the development of learning-to-learn capabilities. By examining the reliabilities and correlations of the factors followed by principal components analyses, we first established the seven constructs (Competence, Affect, Task, Effort, Broadening, flexibility and Independent). Then we examined the gender and grade level differences. The results have shown significant gender differences in five of the seven measures. Except for Competence and Flexibility in which the boys' lower scores did not reach statistical significance, in all the other five measures, boys scored significantly lower than girls. Thus although the boys did not have a substantially lower sense of competence in their schoolwork and flexibility in learning, they did not like school as much as the girls, they were lower in task and effort orientations that were a major driving force for academic pursuit, they were less willing to read and explore new knowledge and skills, and less independent in their learning.

The consistent pattern of lower scores for boys in these crucial factors that may contribute to successful "learning to learn" emphasized in the recent educational reform (Curriculum Development Council, Hong Kong, 2001) is worrisome. Numerous studies have shown that a positive academic self-concept tends to contribute to desirable academic behaviors and outcomes (e.g., Chapman & Tunmer, 1995, 1997; Eccles & Wigfield, 1995; Helmke & van Aken, 1995; Marsh & Yeung, 1997a, 1997b; Muijs, 1997; Wigfield & Eccles, 1992; Yeung & Lee, 1999) and that mastery goal orientations tend to be a positive driving force toward learning and academic excellence (Ames, 1992; Dweck, 1989; Lepper & Hodell, 1989; McInerney et al., 1997; Pintrich & Maehr, 1995; Pintrich, Marx, & Boyle, 1993; Wentzel, 1998). The boys' significantly lower self-concept of affect and lower task and effort goal orientations would probably lead to subsequently lower academic achievements when compared to girls. In turn their lower achievement will further lead to their lower motivation and some may even start to hate school. Thus if the situation remains unchanged in the era of educational reform that emphasizes "learning to learn", the boys in Hong Kong will continue to do worse than the girls and a vicious cycle may start to operate such that high-achieving secondary schools will have mostly girls whereas low-achieving secondary schools will be dominated by male students. In 2002, the Education Department (2002) reported that when the first batch of 81,829 grade 6 students starting secondary 1 (7th grade) in September were processed together in the new secondary school places allocation system, 39.8% of the girls were band one students, compared to 27.3% of the boys in band one. There was obviously a

vast difference between boys and girls in their primary school achievements. Perhaps more lawsuits like that described by Hau (2001) will occur and it will be hard to imagine to what extent such gender difference may have a detrimental effect in the social stability of the future Hong Kong society.

In the era of knowledge explosion, students' learning can no longer rely solely on the teachers' delivery of knowledge and skills. Students need to explore for themselves. They need to be able to work independently. However, the results of the present study show that boys in 4th and 5th grade do not seem to be able to do so as well as their female counterparts. This is another worry, especially when "learning to learn" is the emphasis of the reformed curriculum. The data in the present study suggests that if "learning to learn" is the objective, then we can almost be sure that boys will suffer especially in their secondary school placement that is so competitive in the Hong Kong context.

Hence the policy makers and curriculum designers are faced with the challenge as to how to raise the motivation and make the boys feel that the school is an attractive place. In an era when students need to develop self-learning capabilities, to facilitate boys to learn how to learn, we should examine also those crucial driving forces such as self-concept and mastery goal orientations, and the abilities and traits such as the willingness to broaden one's knowledge and skills, and independence in self-learning. How are we going to motivate boys to work hard in school? What curriculum content will appeal to the boys? What kind of materials will boys like to read? How can boys be trained to work more flexibly and be less dependent on adults? Whereas the official documents of the educational reform (e.g., Curriculum Development Council, Hong Kong, 2001; Education Commission, Hong Kong, 2000, 2002) have thoroughly dealt with various related aspects, the issue of gender difference has remained virtually untouched.

Apart from gender differences, there were also some differences between the grade levels in some of the measures. An inspection of the mean scores for 4th and 5th grades found a general pattern of a decline in all seven measures although the differences were statistically significant in only the measures of Effort and Independence. Thus there was a substantial decline in the level of effort investment and independence in learning as children proceed from 4th grade to 5th grade. Although further evidence from longitudinal data would be required to substantiate this decline, the general pattern of results is worrisome. What has gone wrong in the primary school years? Although it would not have been too surprising in the past few decades when primary students had to work toward a public exam for their placement in the secondary school such that they had to rely heavily on the teachers' input and some of the students might have long given up hope, this situation should not exist any more given the opportunity of entry to secondary school for all today. Further investigations should examine the reasons for such apparent declines in the crucial factors of successful schooling.

A most distressing finding in the present study is perhaps the gender x grade interaction effect indicating that whereas 4th grade girls became more willing to explore new knowledge and skills through reading as they proceeded to 5th grade, the boys, on the contrary, became less willing to do so in 5th grade than in 4th grade. For success in promoting a learning-to-learn strategy, willingness to explore new knowledge and skills through reading is crucial. Was there something wrong with the curriculum contents? Were the contents gender biased such that girls found interest in reading whereas boys were turned off? The finding of this gender x grade interaction has important implications for curriculum designers who are faced with the challenges of reconsidering the gender issue in future curriculum development in the primary school.

Although the present findings have important implications for policy making and curriculum design in the educational reform, the present study also have limitations when interpreting the results. First, the apparent drops in affect toward schooling, mastery goal orientations, and learning-to-learn capabilities across the two grade levels should be further scrutinized with longitudinal data. Secondly, even though from 20 different primary schools, the sample came from the same educational organization that may share similar beliefs and practices. Further studies should use a more representative sample of various school types. Nevertheless, the present study has posed a number of important problems for the educators and curriculum designers to solve in order to help primary student to learn how to learn.

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## Appendix

Scales in the Study and Their Reliabilities

| Self-concepts | Alpha |
|---|---|
| Academic Competence | .82 |
| I am satisfied with my academic results. | |
| Most school subjects are easy to me. | |
| I learn quickly in most school subjects. | |
| I am good at most school subjects | |
| I have always done well in most school subjects | |
| Academic Affect | .74 |
| I like to go to school. | |
| I like to study different subjects. | |
| Going to classes at school is fun. | |
| I hate going to school. @ | |
| Motivation Orientations | |
| Task Orientation | .68 |
| I need to know that I am getting somewhere with my schoolwork. | |
| When I am improving in my schoolwork I try even harder. | |
| I like to see that I am improving in my schoolwork. | |
| Effort Orientation | .71 |
| I try hard to solve problems. | |
| The harder the problem, the harder I try. | |
| I try hard at school because I am interested in my work. | |
| Learning to Learning | |
| Broadening Knowledge | .77 |
| I like to read books. | |
| I like reading whenever I have time. | |
| I usually find the contents of books interesting. | |
| Flexibility | .70 |
| I think in different ways to deal with a problem. | |

| | |
|---|---|
| Every problem may be solved in many different ways. | |
| When I am faced with difficulty, I try various methods to solve it. | |
| Independent Learning | .68 |
| I am good at managing my time at work and at play. | |
| Sometimes I will assess myself to see how much I have learned. | |
| I am able to use my time effectively every day. | |

Note: @ This item was reverse coded. Higher scores reflected more favorable responses.

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