

LAI05464

**A Structural Model of Conceptions of Learning, Achievement
Motivation and Learning Strategies of Hong Kong Teacher Education Students**

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**Paper presented at the Australian Association of Research in Education
Parramatta Conference, University of Western Sydney, Sydney, Australia, 28
Nov - 2 Dec 2005.**

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ABSTRACT

Literature findings suggest that conceptions of learning, achievement motivation and learning strategies are related but how they are related need further examination. In the present study, a questionnaire comprising three inventories to measure conceptions of learning, culturally oriented achievement motivation and learning strategies was administered to 251 preservice teacher education students in Hong Kong. Analysis was conducted by testing a structural model on selected categories of conceptions of learning (learning as an increase in knowledge and learning as personal fulfillment), culturally oriented achievement motivation and learning strategies. Satisfactory goodness of fit index was obtained with the proposed model. Path analysis showed that the conception “learning as an increase in knowledge” was positively and significantly related to social oriented achievement motivation, deep strategy and surface strategy. The conception “learning as personal fulfillment” was positively and significantly related to individual oriented achievement motivation but negatively and significantly related to social oriented achievement motivation. Individual oriented achievement motivation was positively and significantly related to deep strategy but negatively and significantly related to surface strategy. Implications for learning and teaching were drawn based on the model results.

KEYWORDS: Conceptions of learning, culturally oriented achievement motivation, study strategies, Hong Kong

Introduction

Research findings have suggested that conceptions of learning influence students’ motivation to learn and the cognitive strategies they adopt (Hong & Salili, 2000; Purdie, Hattie & Douglas, 1996). Studies conducted by Salili, Chiu and Lai (2001) showed that culture and context of learning influence students’ motivational orientation and achievement. As different cultures value different achievements and different ways of attaining and demonstrating those achievements, it would be reasonable to expect that the same goals may not represent the adaptive approaches to achievement for students of different ethnic and cultural backgrounds. For example, the goal of demonstrating one’s ability to others (generally defined as an ability goal orientation) may represent a competitive goal for students from cultures with competitive and individualistic worldviews. In contrast, the same goal may represent a social responsibility or social solidarity goal for people from cultures with a more unified and collectivist worldview (Urdu, 1997). As the conceptions of learning are shaped by the learners’ cultural values (Hong & Salili, 2000; Purdie & Hattie, 2002), the present study aims to make a preliminary exploration of the relationships of conceptions of learning, culturally oriented achievement motivation and study strategies among Hong Kong Chinese teacher education students. It was proposed that at least some dimensions of conceptions of learning have influence on students’ achievement motivation and subsequently affect the learning strategies the students adopt.

Conceptions of Learning

Conceptions of learning refer to the beliefs and understanding held by the learners about learning. Previous studies on students' conceptions of learning indicated that students conceive learning in different ways, commonly categorized into two broad categories—quantitative and qualitative (Marton, Dall'Alba, & Beaty, 1993; Purdie & Hattie, 2002). The quantitative conception of learning involves the acquisition and reproduction of knowledge. The qualitative conception of learning involves abstraction of meaning and personal change (Purdie & Hattie, 2002). It is usually assumed that the conceptions of learning exist in a hierarchy: the interpretive/constructivist view of learning at the upper level and the acquisition/reproduction view of learning at the lower level. As different social and cultural contexts would influence the learners' conceptions of learning, the generalization of findings on conceptions of learning identified in the Western culture has to be examined using cross-cultural samples. Previous studies in conceptions of learning mainly took the phenomenographic approach whereby interview data or reflective writing were the primary source of data for analysis (Marton, 1994). However, the findings from phenomenographic data cannot be generalized to people in a larger sample. Purdie and Hattie (2002) developed the Conceptions of Learning Inventory (COLI) using a quantitative method to measure nine dimensions of learning. The use of the inventory has made it possible to use the quantitative analysis of a large sample to test hypothesis and theories. The present study thus aims to explore the relationships of selected categories of conceptions of learning, culturally oriented achievement motivation and study strategy using the quantitative approach. 'Learning as an increase of knowledge' was representative of the quantitative or lower level in the hierarchy of conception of learning while 'learning as personal fulfillment' was representative of the qualitative or the upper level in the hierarchy.

Culturally Oriented Achievement Motivation

The notions of individualism and collectivism have been commonly used to dichotomize cultural characteristics of the Chinese and Western cultures. Based on the ideas of individualism and collectivism, Yang and Yu (1988) advanced the ideas of social-oriented achievement motivation (SOAM) and individual-oriented achievement motivation (IOAM). SOAM is characterized by achievement that is oriented toward meeting socially approved standards and fulfilling social expectations. In contrast, IOAM is characterized by an intrinsic motivation to achieve and relatively less concerned about social approval (Hong & Salili, 2000). According to Western assumptions, individuals in the collectivistic context might be low on the motivation to achieve. The 'motivation to achieve' and 'motivation to affiliate' are assumed to be at odds with each other as striving for individual success, which is typical of individualism, is incompatible with meeting socially approved standards, which is typical of collectivism (Chang, Wong, & Teo, 2000). This study aims to investigate whether these assumptions about achievement motivation can be applied to the context of the Hong Kong Chinese culture. The present study also explores how individual-oriented and social-oriented achievement motivations relate to the quantitative and qualitative categories of conceptions of learning.

Learning Strategies

The surface and deep learning approaches, each of which comprises the motive and strategy components, have been well described by Biggs (1991). The surface strategy derives from an extrinsic motive whereby students resort typically to rote-memorization of details and facts and reproducing them as accurately as possible. In contrast, students who learn by using the deep strategy would seek a deeper level of understanding and try to understand the content, the argument and the meaning of the learning materials. While research has suggested a close relation between achievement motivation and learning strategies (Leung & Chan, 1999; Pintrich, Roeser & DeGroot, 1994), there have been little investigations on how conceptions of learning are related to the adopted study strategies using Hong Kong Chinese samples. The findings in this area would be significant in filling the gap in the literature.

Aim of the Study

This study aims to explore the interrelationships of conceptions of learning, culturally oriented achievement motivation and learning strategies of Hong Kong Chinese teacher education students. A structural model was proposed with paths drawn to represent the relations among the three variables and the model was tested by structural equation modeling procedures.

Method

Participants

The participants of the study comprised 251 pre-service teacher education students (61 males and 190 females) enrolled in the Bachelor of Education (BEd) ($n = 232$) and Post-graduate Diploma in Education (PGDE) ($n = 24$) programs. Since the number of male and PGDE students were relatively small in comparison with the whole sample, analysis of item responses was conducted as a whole.

Measuring Instruments

The following questionnaires were used to assess the three variables:

- a. Conceptions of learning: The questionnaire known as The Conceptions of Learning Inventory (COLI) developed by Purdie and Hattie (2002) was adopted. Participants were asked to rate their responses to 45 items using a 7-point rating scale with 1 (strongly disagree) to 7 (strongly agree). The scale has been validated by Purdie and Hattie and satisfactory goodness of fit index and psychometric properties, with NNFI =.98 and RMSEA =.05 being cited in literature. To apply the scale in the present study, a preliminary confirmatory factor analysis was conducted with the items of the identified 9 dimensions reported by Purdie and Hattie (2002). Items within each dimension that carried factor loading under .45 were deleted. To simplify the path model, two dimensions i.e. "Learning as increase of knowledge" and "Learning as personal fulfillment" were selected to be included in the path model for further analysis, as they were representative examples of the quantitative and qualitative conceptions of learning.
- a) Culturally oriented achievement motivation: An adaptation of the questionnaire developed by Yang and Yu (1986) was used. The questionnaire consists of 12 items with 2 subscales (IOAM and SOAM) which determine whether the

participants' achievement motivation was individual-oriented or social-oriented using a 6-point rating scale with 1 (strongly disagree) to 6 (strongly agree) Initial confirmatory factor analysis also results in that any items with loading below .45 were not included in the path analysis.

- b) Learning strategies: Biggs' Revised Two-factor Study Process Questionnaires (Biggs, Kember & Leung, 2001) were used. The questionnaires assessed both the surface and deep approaches to learning, with each comprising the motive and strategy subscales. A 5-point rating scale with 1 (strong disagree) to 5 (strongly agree) was being used. To serve the purpose of the present study, only the results of surface strategy and deep strategy subscales were analyzed. Again, initial confirmatory factor analysis results in that any items with loading below .45 were not included in the path analysis.

Results

Preliminary Analysis and Psychometric Properties of the Adapted Instruments

Reliability

Statistical results showed that the reliability coefficient alphas for the subscales of the three variables ranged from .57 to .85. Except for the low reliability coefficient alpha value of deep strategy ($r=.57$), the overall alpha values were considered satisfactory and adequate for research purposes (Nunnally, 1978).

Validity

Confirmatory factor analyses were conducted separately to examine the construct validity of the scales for the conceptions of learning, culturally oriented achievement motivation, and learning strategies. Figure 1 presents the findings for the two dimensions of the conceptions of learning namely, learning as an increase in knowledge ('learnk') and learning as personal fulfillment (learpf). The results indicated that all item factor loadings on 'learpf' were above .50 which were of satisfactory values. Three items on 'learnk', which factor loadings were above .50, were retained whereas three items with factor loadings below .45 were not included in the later analysis. The correlation between these two factors is moderately strong (.48) and the standardized estimates shown in Figure 1 suggest that the selected items measure the two factors reasonably well. The overall fit for this two-factor model for the conception of learning is satisfactory with the RMSEA = .083. The GFI = 0.95. AGFI = .90 and the NNFI = .93.

Figure 2 shows the results of the confirmatory factor analysis of the two-factor model of achievement motivation, viz. individual-oriented achievement motivation (IOAM), and social-oriented achievement motivation (SOAM). Each of the two factors originally consists of six items. However, items with factor loadings below .45 were excluded from further analysis. As the result, the remaining items (three for each of the factors) perform well in explaining the two factors as the standardized estimates are quite high. A negative correlation was found between the two factors though the magnitude was relatively small (-.18). This finding coincides with the literature that these two types of achievement motivation tend to relate negatively with each other. This two-factor model attains an adequate fit to the data with the RMSEA = .082, the GFI = .97, the AGFI = .92 and the NNFI = .95.

The results for the confirmatory factor analysis of the learning strategy are shown in Figure 3. There are originally five items for each of the two factors, viz. deep strategy (deepst) and surface strategy (surfst) respectively. Decision was made that only items with factor loadings above .45 would be retained for further analysis. The overall fit for this two factor model is good with the RMSEA of .015. The GFI=.99. The AGFI=.97 and the NNFI=.99. It is of interest that there is no significant correlation for the deep and surface strategies as the estimated coefficient is -.01 and it is not significant at .05 level. This finding indicated that though the several items as listed in Figure 3 measure learning strategies, the items as grouped under deep strategy are distinctively different from those classified as surface strategy in terms of their factor loading.

Path analysis of the proposed model

A path model illustrating the interrelationships among the three variables, conceptions of learning, achievement motivation, and the learning strategies, was constructed and tested using LISREL 8.15 for Windows. The model was constructed on the basis of the relationships as described above, and was fitted to the data mentioned above. The model proposed that conceptions of learning predict culturally oriented achievement motivation, which in turn determines the strategies adopted for learning.

Figure 4 shows the results of the path analysis. The diagram shows the estimated standardized coefficients for the paths linking the six factors for the conceptions of learning, achievement motivation, and the learning strategies. The path coefficients shown in Figure 4 were significant at 0.05 level whereas the insignificant paths were deleted from the diagram. Figure 4 shows that learning as an increase of knowledge had positive and significant influence on SOAM (path coefficient =.35) but not on IOAM. Learning as personal fulfillment had positive and significant effect on IOAM (path coefficient = .54) whereas it had significantly negative effect on SOAM (path coefficient = -.26). On the other hand, learning as increase of knowledge had positive influence on both the surface and deep learning strategies (path coefficients were .45 and .28 respectively). Learning as personal fulfillment had no significant influence on either the deep strategy nor the surface strategy. When examining the influence of achievement motivation on learning strategies, it was found that IOAM had significantly positive influence on deep strategy (path coefficient =.32) while the influence on surface strategy was significantly negative (path coefficient = -.32). Further, SOAM had no significant effect on both the deep and surface strategies.

This model achieves an overall good fit, with the RMSEA of 0.057, the GFI of 0.89, the AGFI of 0.876 and the NNFI of 0.93. This implies that the pattern of relationships taken as a whole as hypothesized by the model fits the data well.

Discussion

Hypothesized interrelationships Among Variables

This study seeks to analyze the interrelationships among the conceptions of learning (as indicated by the two factors “learning as increase in knowledge” and “learning as personal fulfillment”), the achievement motivation (as denoted by the individual-oriented and the social-oriented achievement motivation), and the learning strategies (as measured by the deep and surface learning strategies). It was

hypothesized that the way in which the teacher education students conceive learning will have direct influence on their achievement motivation, which in turn determines the learning strategies they adopt. To be specific, the understanding of learning as an increase in knowledge would be more likely to relate positively to social-oriented achievement motivation, whereas to view learning as personal fulfillment tend to relate positively to the individual-oriented achievement motivation but to relate negatively to the social-oriented achievement motivation. Additionally, this study proposes that individual-oriented achievement motivation would predict positively deep learning strategy but relate negatively to surface learning strategy. Regarding the social-oriented achievement motivation, this paper suggests that it would relate positively to surface learning strategy but negatively to deep learning strategy. Finally, the students' conceptions of learning would also directly affect the learning strategies they would adopt: the emphasis of learning as personal fulfillment would be more likely to associate positively with the deep approach to learning.

Influence of Conceptions of Learning on Achievement Motivation

Results of the statistical analysis showed that the hypothesized relationship between conceptions of learning and achievement motivation was supported. The relationship between learning as an increase in knowledge (learnk) and the achievement motivation (ioam and soam) as revealed by the fitted model in Figure 4 confirms our expectation. It was found that 'learnk' had significant and positive influence on 'soam', indicating that the understanding of learning as an increase in knowledge provides a source of achievement motivation which was primarily intended to meet socially approved standards. As the path leading from 'Learnk' to IOAM was not significant, it indicated that the teacher education students who view learning as an increase of knowledge was not likely to be concerned with the intrinsic motivation that come from within the individual. It is further worth noting that the relationship between 'learpf' and the two factors for achievement motivation as hypothesized by the model coincides with the theoretical expectation. According to the path model, to view learning as personal fulfillment generates an important source for intrinsic motivation for achievement as indicated by the moderately high and significant path coefficient. The same view about learning significantly relates to the social-oriented achievement motivation in a negative way, suggesting that the more the teacher education students view learning as personal fulfillment, the less likely their achievement motivation is oriented towards meeting socially approved standards.

Influence of Achievement Motivation on Learning Strategies

In examining the relationship between achievement motivation and learning strategies, it was noted that the two paths linking 'ioam' with deep learning strategy ('deepst') and surface learning strategy ('surfst') are both significant. However, the path coefficient for 'ioam' to deep strategy was much stronger than that to surface strategy. The results can be interpreted that the more intrinsically motivated the students are, the more likely they would adopt the deep learning strategy and the less likely they would adopt the surface learning strategy. This finding clearly suggests that an intrinsic source of motivation for achievement significantly accounts for the adoption of deep learning strategy for learning. By contrast, the relationships between 'soam' and the two types of learning strategies ('deepst' and 'surfst') are not significant at all. The results of the findings tend to support the expectation about the relationship between achievement motivation and the learning strategies.

Influence of Conceptions of Learning on Learning Strategies

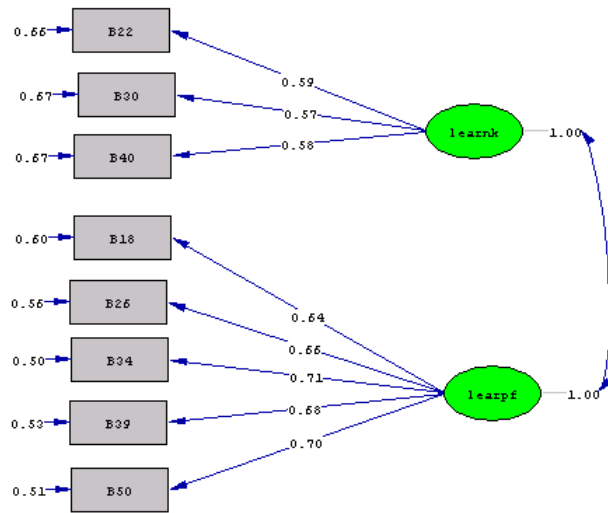
The path analysis also sheds lights on the relationships between conceptions of learning and the learning strategies the students adopt. Statistical results show that the path coefficient between 'learnk' and "surfst" is moderately strong (.45) whereas the coefficient between between 'learnk' and "deepst" is relatively weak (.28), implying that viewing learning as an increase in knowledge is more likely to lead to the adoption of the surface strategy than the deep strategy. Learning as an increase in knowledge has a strong predictive power over the adoption of the surface learning strategy. In contrast, the students who view learning as personal fulfillment is likely to adopt the deep learning strategy and abandon the surface strategies. In short, the findings here tend to support the hypothesized relationship between the two factors in conceptions of learning and the two learning strategies. The results suggest that students who view learning as an increase in knowledge tend to adopt more of the surface strategy than the deep strategy whereas students who view learning as personal fulfillment tend to adopt a deep strategy rather than a surface strategy in learning.

Conclusion

Students' conceptions of learning have an effect on their achievement motivation and learning strategies. The proposed model illustrating the interrelationships among the aforementioned three variables was tested and validated by confirmatory factor analysis with satisfactory goodness of fit index. As shown in the model and paths, the effect of conceptions of learning on learning strategies could be direct or mediated by the achievement motivation held by the students. The present study generates the following findings: First, the conception of "learning as an increase in knowledge" has a moderately strong predictive effect on "social oriented achievement motivation" and "surface strategy". Second, the conception of "learning as personal fulfillment" is much more strongly linked to "individual oriented achievement motivation" than "social-oriented achievement motivation", and that "social-oriented achievement motivation" has only weak linkage with both "deep" and 'surface" strategy in learning. Third, individual oriented achievement motivation is moderately linked to "deep" strategy but weakly linked to "surface" strategy.

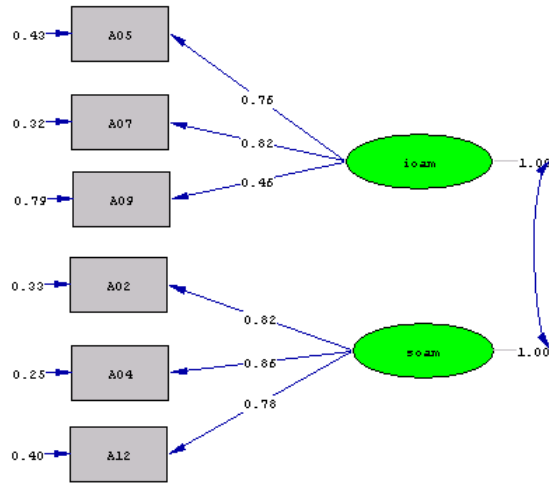
Establishing the relationship among the three variables probably helps us understand the cognitive and affective aspects of students' learning. Research literature has highlighted that teachers' conceptions of learning would have an effect on their future teaching practices. Based on the findings of the present study, it would seem appropriate that teacher education students' awareness of the nature and dimensions of learning can be further enhanced. Opportunities need to be provided to teacher education students to explore and broaden their views about learning. Effort can be devoted to help students develop an understanding about learning at a higher level of the hierarchy of conceptions of learning, i.e. the interpretive and constructivist level. This can be addressed either explicitly or implicitly in the curriculum activities of the teacher education programs. Further studies may also attempt to explore the gender differences and program-specific factors with respect to the relational study of these variables.

Figure 1. Confirmatory factor analysis for learning as increase in knowledge (learnk) and learning as personal fulfillment (learpf), with the correlation of 0.48 and the standardized estimates shown for each path (NNFI = 0.93)



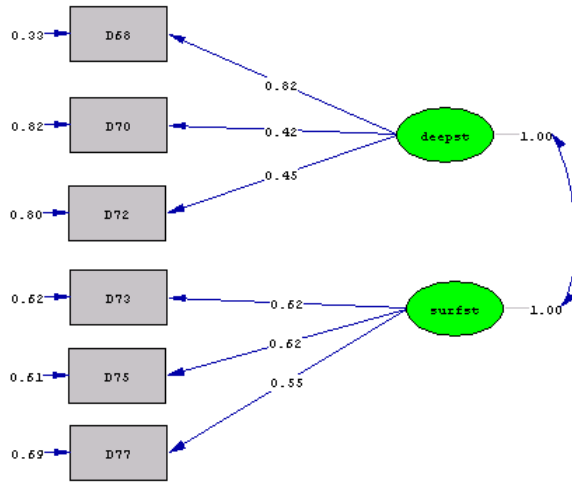
Chi-Square=48.46, df=19, P-value=0.00022, RMSEA=0.083

Figure 2. Confirmatory factor analysis for IOAM (individual-oriented achievement motivation) and SOAM (social-oriented achievement motivation), with the correlation of -0.18 and the standardized estimates shown for each path (NNFI=0.95)



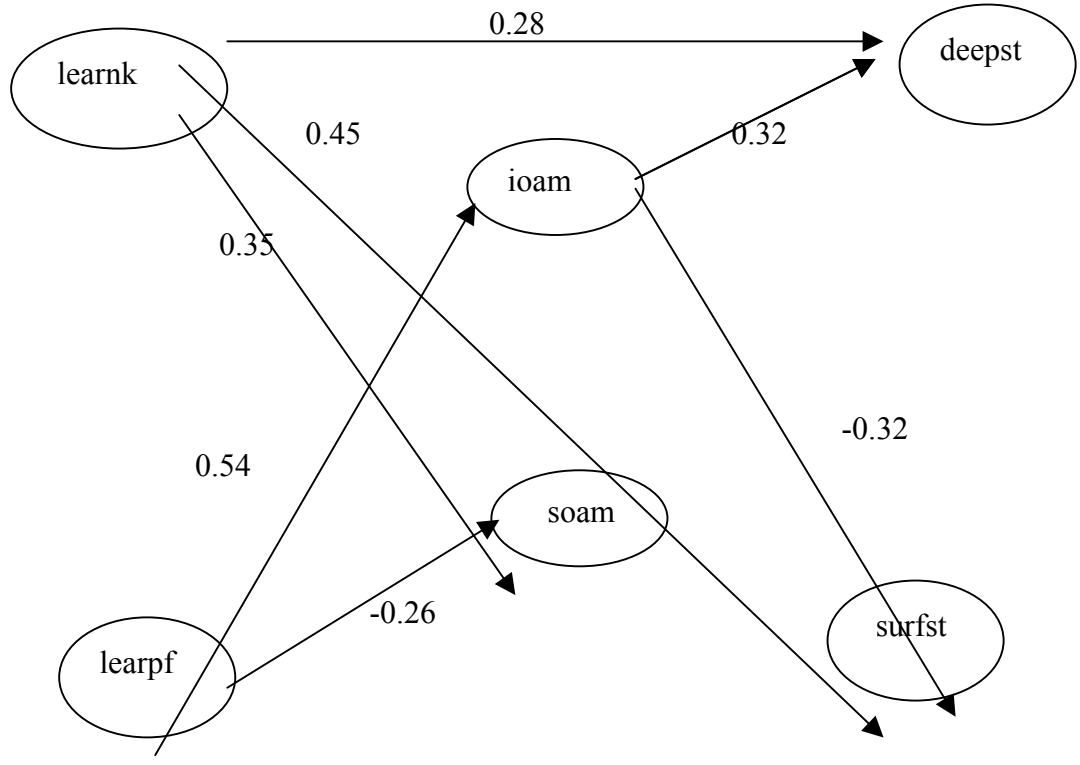
Chi-Square=20.19, df=8, P-value=0.00964, RMSEA=0.082

Figure 3. Confirmatory factor analysis for deep learning strategy (deepst) and surface learning strategy (surfst), with the correlation of -0.01 and the standardized estimates shown for each path (NNFI=0.99)



Chi-Square=8.42, df=8, P-value=0.39318, RMSEA=0.015

Figure 4 Path model for the conceptions of learning, achievement motivation, and learning strategies (chi-square=270.21, df=157, p-value=0.00, RMSEA=0.057, NNFI=0.93)



The path coefficients are significant at 0.05 level
Insignificant paths are deleted from the diagram

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