# An examination of changes in the approaches to learning of Confucian heritage culture (CHC) students' over time in a new social, cultural, and academic environment

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**Abstract:**

A longitudinal study was undertaken to investigate whether CHC students' approaches to learning were retained or modified in a Western social, cultural, and educational environment. A bilingual version (Chinese and English) of the *Study Process Questionnaire* (Biggs, 1987) (SPQ) was used to measure sojourner students' approaches to learning on five occasions over two years in Australia. A two-level analysis was undertaken at the intra and inter student levels to see if there was change in the students' approaches to learning. A negative occasion slope for Surface Motivation suggested that superficial learning decreased while the positive occasion slopes associated with the Deep and Achieving approaches to learning indicated that approaches to learning that were problem-based and directed toward achievement increased over time. These results showed that five of six approaches to learning changed during the period, but not for all groups of students. While there was no significant change for the Surface Strategy approach over time, there were effects associated with this approach and the characteristics of particular groups of students.

**Key words:**

Approaches to learning, *Study Process Questionnaire*, intra and inter student levels, two-level analysis, occasion slope, direct effects and interaction effects.

## Introduction

A longitudinal study was undertaken to investigate whether students from Confucian heritage cultures changed or in some way modified their approaches to learning in a Western social, cultural and educational environment. Multilevel modelling, that used hierarchical linear modelling (HLM) (Bryk, Raudenbush and Congdon, 2000) was employed to examine the data. Thus, analyses were undertaken at the intra and inter student levels to assess the degree of change that had occurred. HLM was also able to indicate an absence of change.

In order to ensure an interval scale of measurement, the raw score data that were obtained from the SPQ were scaled and equated using the QUEST program (Adams and Khoo, 1993). The Rasch model was employed to produce interval scales on which all items in a particular scale and all participants in the study were placed. This procedure enabled the examination of the performance of individual students to be examined over time, rather than the mean performance of a sample of students. This was particularly useful as there was considerable variability between different students who provided responses on the five occasions of measurement. Therefore, if a student responded on at least two of the five occasions, the data provided were included.

An original sample of 153 cases was examined on five occasions over a period of two years in Australia. At the completion of the investigation a total of 573 case records were available

for analysis. Only responses from sojourner students who said that they intended to return to their home country on completion of their studies were included in the data set. Data on the students' approaches to learning were gathered using a bilingual (Chinese and English) version of Biggs' (1987a, 1987b) *Study Process Questionnaire* (SPQ). On the first occasion this was done by the investigator personally, but on subsequent occasions, the data were collected on line, using the internet and a university server. There were three occasions of measurement in the first year and two in the second year of the study.

The six approaches to learning had been designated by Biggs (1987a) as: Surface Motivation, Surface Strategy, Deep Motivation, Deep Strategy, Achieving Motivation and Achieving Strategy. Each of the approaches was measured by a scale of seven items from the 42 questions and statements on the SPQ.

The structure of approaches to learning was established using confirmatory factor analysis and the LISREL 8.30 computer program (Jöreskog and Sörbom 1999). The best-fitting model, of the many that were tested, was a baseline model whereby the six approaches to learning (latent variables) were allowed to correlate freely with each other and the observed (manifest) variables.

Biggs (1987a) has specified the three approaches to learning as Surface, Deep and Achieving. Each approach is composed of a motivation that directs learning and a strategy for the implementation of the approach.

Table 1 shows the motivations and strategies in students' approaches to learning in tabular form together with exemplars of each motivation and strategy.

**Table 1 Motivations and strategies in student approaches to learning**

| Approach | Motive | Strategy |
|---|---|---|
| **SA: Surface** | **Surface Motivation** (SM) is instrumental: to meet requirements minimally; a balance between working too hard and failing. | **Surface Strategy** (SS) is reproductive: to limit target to bare essentials and reproduce through rote learning. |
| **DA**: **Deep** | **Deep Motivation** (DM) is intrinsic: study to actualise interest in what is being learned; to develop competence in academic subjects. | **Deep Strategy** (DS) is meaningful: read widely, inter-relating with previous relevant knowledge. |
| **AA**: **Achieving** | **Achieving Motivation** (AM) is based on competition and ego-enhancement: to obtain highest grades, whether or not material is interesting. | **Achieving Strategy** (AS) is based on organising time and working space; to follow up suggestions; behave as a 'model' student. |

Following Biggs (1987a) and Murray-Harvey (1994)

The Surface Approach is utilitarian. The motivation is to gain maximum qualifications and strike a balance between working too hard and failing. The strategy that is employed is reproductive and often utilises rote learning. The Deep Approach is based on actualising what is learned by reading widely and relating new knowledge to previously gained information whereas in the Achieving Approach, the student's primary motivation is to gain the highest possible grades by being an ideal student, by being punctual to class and by using strategies such as extra reading and research that assists the individual student to attain his or her desired goals.

All students are likely to manifest all three approaches to learning to some degree at some time in the process of studying and learning. However, the primary concern of this investigation is to understand more about how CHC students learn, particularly in an educational environment that is physically, socially and culturally Western. Other investigators examine learning within students' home cultures (Watkins and Biggs, 1996, 2001). Still others conclude that the Achieving Approach to learning is not as important to as the Deep and Surface Approaches (Biggs, Kember and Leung, 2001; Kember, Biggs and Leung, 2004). However, for students in this study, the Achieving Approach to learning appears to be critically important to academic success.

### Overview of the HLM procedure

Hierarchical linear modelling (HLM) allows the investigator to model possible changes in student's approaches to learning by the examination of changes: a) within individual students over time as an estimation of the occasion of measurement in the students in the sample (intra student change); b) between different students in the same study sample in two distinct ways (inter student change): 1) as a direct effect on the level of an approach to learning taken by students which may increase, decrease or remain the same; and 2) as an interaction effect between students, the approach to learning and time as measured by occasion.

The outcome variables used in separate analyses in the multilevel modelling were the six approaches to learning listed above. At Level-1, the predictor variable was time, as determined by the five occasions of measurement. At Level-2, the student level characteristics that had been measured on the first occasion were accepted if they were significant at the 0.05 level.

Therefore three questions acted as a guide to the investigation of the data collected on changes in students' approaches to learning: (a) was there change in the learning approaches over time; (b) was the level of the measured approaches to learning the same or different between students (a direct effect); (c) if there was a difference between the approaches to learning of groups of students, what was the probable cause of the change that was an interaction effect between three factors: time, the student characteristic and the approach to learning scale?

### Summary of the effects for the three approaches to learning

Figure 1 shows results for the student characteristics that are associated with the Surface Approach to learning and Figure 2 shows results for the student characteristics associated with the Deep Approach to learning and Figure 3 shows results for the student characteristics associated with the Achieving Approach to learning. Specific results are discussed in the section that follows.

All the significant effects for the three approaches to learning are summarised in the three figures below. At Level-1, the significant Occasion effects are indicated as solid lines while non-significant effects are seen as dashed lines. At Level-2, an effect that influences an outcome variable directly is indicated by lines that pass from the effect to the outcome variable directly whereas an effect that influences a variable indirectly is shown by a line that passes from the effect to the outcome variable by way of the associated occasion variable. Therefore, interaction effects are moderated through the Level-1 variable Occasion. Table 2 shows the predictor and interaction effects for learning. It shows the significant effects and specifies the ways in which each of the variables has been coded. Greater detail on these data, the variance explained, the deviance and the methods of analysis utilised may be found in Matthews (2004).

The analyses undertaken showed that changes with respect to five of the six approaches to learning were statistically significant. Therefore, a negative occasion slope for Surface Motivation indicated that superficial learning decreased while the positive occasion slopes associated with the Deep and Achieving learning approaches indicated that problem-based learning approaches that were directed toward achievement increased over time. These results further showed that although five of the six

approaches to learning changed during the period in which measurements were made, not all groups of students changed their approaches to learning. Further, while there was no significant change for the Surface Strategy approach over time, there were significant direct and interaction effects associated with this approach to learning and the characteristics of particular groups of students. Therefore, although the study provided evidence that learning approaches do change measurably over a two year period, three important questions were raised: why do some groups of students change whereas some do not and still other groups remain the same?

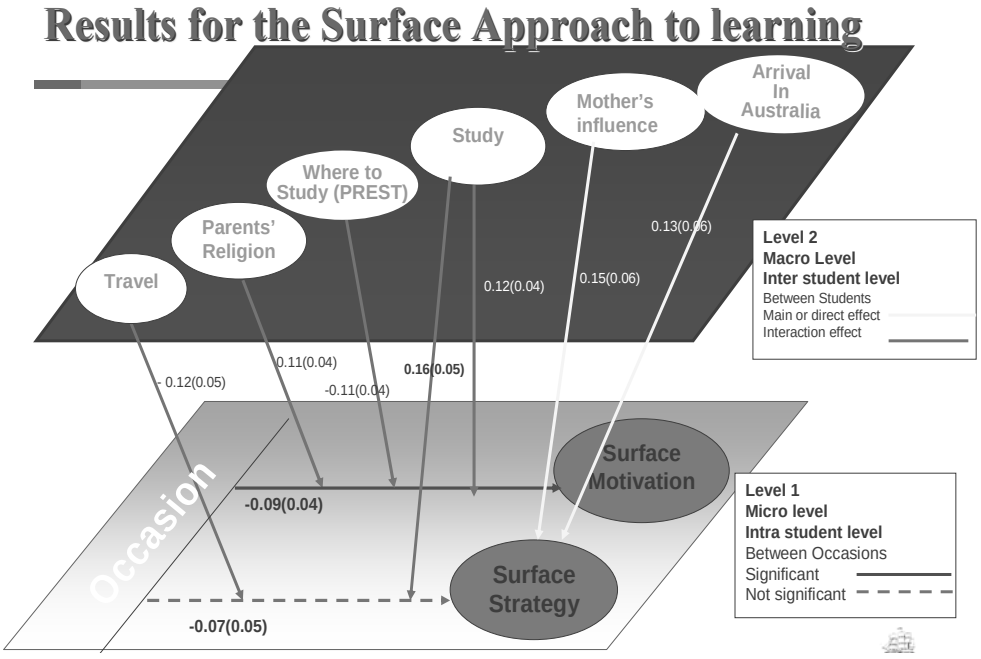


**Figure 1 The Surface Approach to learning**

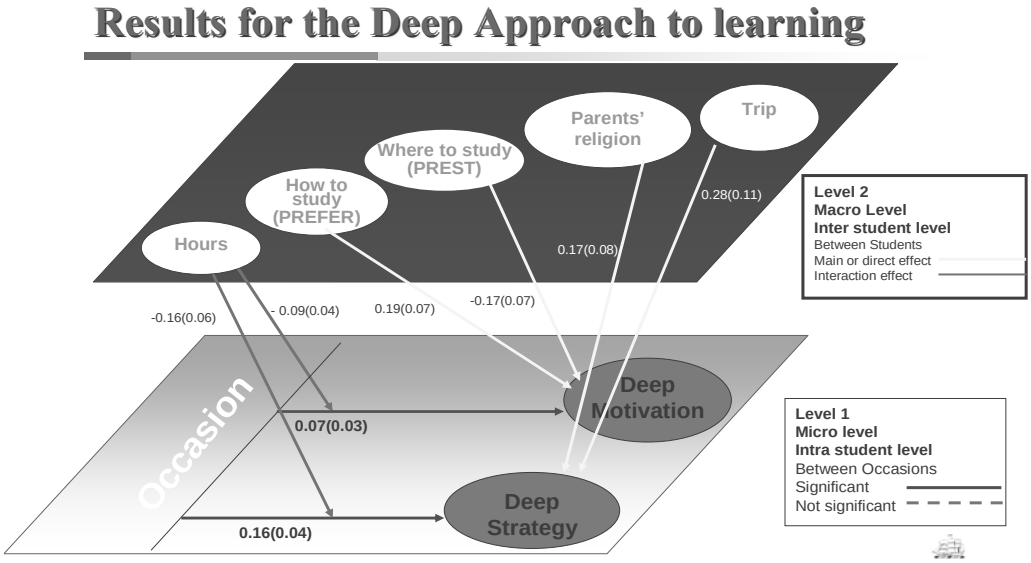


**Figure 2 The Deep Approach to learning**

**Table 2 Predictor and interaction effects for learning**

| | Surface Motiv | Surface Strat | Deep Motiv | Deep Strat | Achiev Motiv | Achiev Strat |
|---|---|---|---|---|---|---|
| **Direct effects; Adjusted occasion slope (Slope at $\beta_1$)** | **-0.087†** | -0.070 | **0.073** | **0.164** | **0.053‡** | **0.127** |
| **Gender**-sex of students<br>Female = 1, Male = 0 | | | | | **0.216†** | |
| **Granrel**-grandparents religion<br>Different beliefs to grandparents = 1 Same beliefs as grandparents =0 | | | | | **-0.217** | |
| **Agegp**-age group of student<br>Over 25 = 1, 25 years or under = 0 | | | | | **0.206** | **0.223** |
| **Mominflu**-Most influential person in childhood - under five years<br>Mother = 1 , Another person=0 | | **0.147** | | | | **0.174‡** |
| **Arinoz** –When student arrived in Australia<br>>1 year ago = 1 , <1 year ago = 0 | | **0.134** | | | | |
| **PREST**-Where student prefers to study<br>Home = 1 , Not at home = 0 | | | **-0.166** | | | |
| **Prefer** How the student prefers to study<br>Alone = 1 , With others = 0 | | | **0.189** | | | |
| **Trip** –Student lived overseas before coming to Australia<br>Trip = 1, No trip = 0 | | | | **0.280** | | |
| **Country** -Country of birth<br>Less developed=1, Developed = 0 | | | | | **0.166** | |
| **UniSA**-University attended by student<br>UniSA or TAFE = 1 , Another university =0 | | | | | **-0.189** | |
| **Parrel**- Parents' religion<br>Different beliefs to parents = 1 Same beliefs as parents =0 | | | | **0.166** | | |
| **Interaction effects** | | | | | | |
| **Study**- Student's major area of study-<br>Business subjects=1, Other subjects=0 | **0.121** | **0.155** | | | | |
| **PREST**-Where student prefers to study<br>Home = 1, Not at home = 0 | **-0.113** | | | | | |
| **Parrel**- Parents' religion<br>Different beliefs to parents = 1 Same beliefs as parents =0 | **0.111** | | | | | |
| **Hours**-Hours of study<br>10+ hours each week =1, <10 hours each week=0 | | | **-0.093** | **-0.156** | | **-0.267** |
| **Couvis**-Countries visited before coming to Australia<br>Beyond Asia = 1, Asia only = 0 | | | | | | **0.113‡** |
| **Travel**- Travel before coming to Australia<br>Travel = 1, No travel 0 | | **-0.115** | | | | |
| **Speak**-Language spoken at home in Australia<br>English = 1, Home or other language=0 | | | | | **-0.104** | |

‡These variables are significant at the ten per cent level †All significant slopes and effects

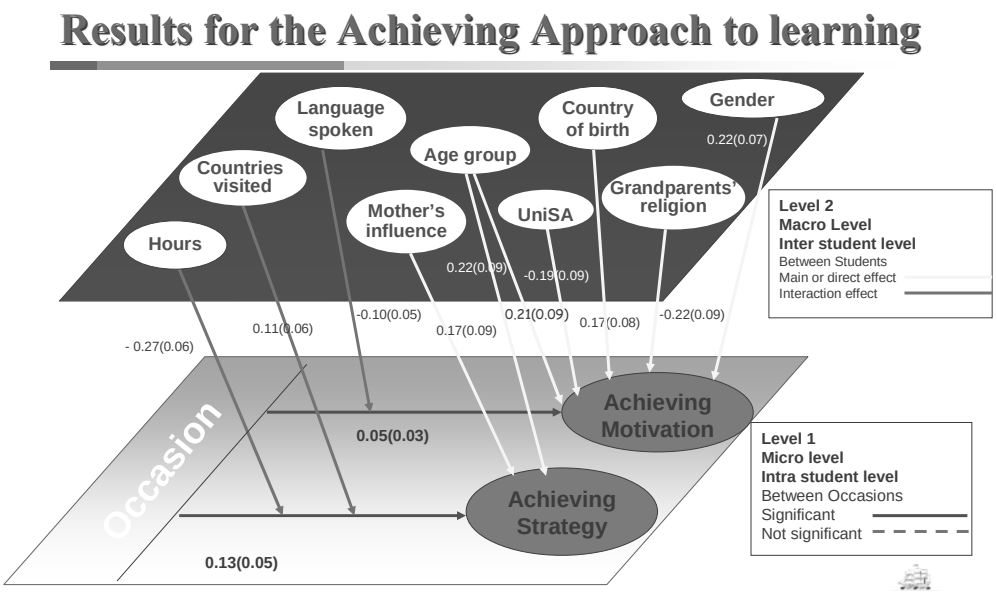


**Figure 3 The Achieving Approach to learning**

**Differences between groups of students shown by Level-2 direct effects**

*Age of students.* Older students, those over the age of 25, are higher in Achieving Motivation than students aged 25 years or less. Older students would appear to be more highly motivated to succeed in their studies than younger students. They seem to be motivated to make more of an effort and study harder than younger students and to use strategies that assist them to achieve better results. Their motivations and strategies are guided by the need to achieve that comes from family, teachers and others in their home countries who want the skills these students have been sent to Australia to acquire. The high level of Achieving Motivation seems to occur because of a need to achieve so that they may be of greater use on their return to their country of birth. These results are consistent with research reported by Butcher (2002) and Ward and Kennedy (1993a, 1993b, 1999).

*Gender of students*. Women are significantly higher in Achieving Motivation than men in this study. Women may feel a greater need to attain and are, therefore, more highly motivated to achieve in Australia than men from Confucian cultures. Zhang Zhen (2001) comments that women have a stronger motivation to achieve than men do and that this effect is particularly strong in contemporary Asian women who live in urban environments. Further if the women students are married, their own and their husbands' families may be encouraging them to reach higher levels of Achieving Motivation.

*Most influential person.* Students who say their mothers have been the greatest influence on their pre-school years are higher in both Surface and Achieving Strategies. Mother's influence is marginally significant in its effect on Achieving Strategy. Mothers encourage higher levels of excellence and appear to demand higher academic outcomes than other, less interested persons. Therefore, it would seem that students who are influenced by their mothers' encouragement choose learning strategies to assist them to succeed at a higher level in their chosen field of study. The effect of increasing Achieving Strategy confirms the importance of mothers as people who encourage high levels of achievement. Yue and Ng (1999) have found similar results in their research. The coefficient mother's influence indicates that this influence has a significant and positive effect on Surface Strategy. Ho (1994, 1996) has also found that mother's influence is important in the lives of students from Confucian cultures.

*Grandparents' religious beliefs.* Students who have different religious beliefs to their grandparents are lower in Achieving Motivation than students who have the same religious beliefs as their grandparents. In Asia many young people are brought up or strongly influenced by their grandparents. This is particularly true in countries where the extended family is of cultural and practical importance. Young persons may spend more time with their grandparents than with their parents. Therefore, grandparents often have an important role in the cultural and attitudinal development of the young so

that if grandparents have strong religious beliefs, it is likely that these beliefs may have been passed on to their grandchildren (Yen Mah, 2000). In contrast, the results show that these students may have rejected their traditional religious beliefs or may have sought a new support network that a religious group is able to provide and one that has replaced the encouragement given by grandparents and members of the extended family in Asia. Therefore, if grandparents have positively influenced students' religious beliefs, this influence is likely to remain with them because it provides a measure of stability in their lives in a new academic setting and is related to the high level of Achieving Motivation noted in this study and in a recent article published by Butcher (2002).

*Time of arrival in Australia.* Students who have been in Australia for more than one year are higher in Surface Strategy whereas those who have been in Australia for less than one year are lower in this approach to learning. A superficial approach that uses rote memorisation may assist those students who have been in Australia for more time to achieve the qualifications they are seeking from their study in a Western learning environment.

*Students' preferred place and manner of study.* Students who study away from home and alone are higher in Deep Motivation than students who say they prefer to study at home or in a group. This outcome may reflect the conditions in which most students live. The places where students can afford to live are often noisy or crowded so that students who are serious about their academic work look for a quiet place to study away from the distractions found in the home environment. Further, studying on their own represents a change from what (Biggs, 1996a, 1996b and Tang and Biggs, 1996) have said about CHC students' preferences for studying in groups in their home environment in Asia. Therefore, finding a suitable place to study enables most students to ponder over what they are learning and may increase students' motivation to produce well written assignments in English.

*Parents' religious beliefs.* Students who have different religious beliefs to their parents are higher in Deep Strategy compared with students who have the same religious beliefs and practices as their parents. Butcher (2002) comments that a change in religious beliefs is a common phenomenon in Asian students who study in Western learning environments. These students read widely and relate what they are studying to previous knowledge. Holding different religious beliefs may be part of the strategy that helps these students in their studies.

*Attendance at University of South Australia (UniSA) or Adelaide TAFE.* Students who attend the University of South Australia or the Adelaide College of Technical and Further Education (TAFE) are much lower in Achieving Motivation. The information that may be deduced from these data is that students who attend either Adelaide or Flinders Universities may be more academically inclined and therefore, more motivated to achieve than University of South Australia students or those who come to Australia to study English at the tertiary level as TAFE students. These students may not be seeking the rewards that a higher level of achievement can provide.

*Development of the home country.* Students who come from less developed countries are higher in Achieving Motivation than those students who come from more developed countries. This is understandable because students from countries less developed than Australia are generally sent to acquire skills needed to improve the educational, technological and agricultural level of development in their own countries. These students are likely to have been chosen because of their high motivation to achieve and enthusiasm to learn skills to take back to their own countries after study in Australia as well as their awareness of the particular needs of their home countries. Cannon (1999) and Chan (1988) have found similar results in their own research.

*Previous travel.* Students who have travelled extensively before coming to Australia are considerably higher in Deep Strategy compared with those who have not had the opportunity to travel. This variable is coded 1 for students who have travelled for a period of a month or more and 0 for students who have not travelled at all or only travelled to the Asian region. As Ward and Kennedy (1993a, 1993b, 1994, 1999) and Ward et al. (2001) have commented, students who have lived overseas for longer than a holiday are markedly higher in deep approaches to learning than students who have travelled for short periods to a similar cultural environment or who have never travelled. Their previous travel would appear to have shown these students more of the world and may have resulted in students who are intellectually stronger compared with those who have not travelled. Previous

travel may also have heightened their interest in what they are studying and thus encouraged them to use deeper strategies in their academic studies as noted in their approaches to learning.

**Differences between groups of students shown by Level-2 interaction effects**

*Subject of study effects.* Students who study business and commerce subjects show interaction effects with the Surface Motivation and Surface Strategy learning scales. The coefficient is positive and indicates that these students show a slight increase in scales associated with the Surface Approach to learning. This may occur because business and commerce subjects require more rote memorisation than deep thought whereas students who study other subjects show a decrease in this learning approach over time. This is shown by a negative value for time as measured by the occasion slope. The interaction effect shows that students who study other subjects to use a deeper learning strategy than students who learn by memorisation alone.

*Students' preferred place of study effects.* Students who prefer to study at home seem to show a greater decrease in Surface Motivation than students who have said they prefer to study away from home over their time of study in Australia. Students who choose to study at home would appear to be less motivated to use a superficial approach to learning than students whose prefer to study away from the home environment. These students may find that they are not as superficially motivated to learn as they were in the country of their birth. Moreover, it should be noted that this decrease in Surface Motivation is not accompanied by an increase in a deeper approach by this group of students.

*Parents' religious beliefs effects.* Students who have different religious beliefs to those of their parents show a slight increase in Surface Motivation over time. However, if students do not change their religious beliefs in Australia, there is a significant decrease in the value of the occasion slope as noted in Table 2. Butcher (2002), Chang (2000), Ward and Chang (1997) and Ward et al. (2001) comment that many students express the desire to follow different religious practices when they are studying in cultural environments dissimilar to those in their home countries. Even if students have changed their religious practices, there does not appear to be a large effect on the Surface Motivation that directs their study.

*Student travel effects.* Students who have travelled before coming to Australia to study show a greater decrease in Surface Strategy over time compared with students who have not travelled. This would appear to indicate that students who had travelled have decreased their use of a superficial approach to learning as a result of travel. These students may have been influenced by what they had seen and experienced during their travels which may have led to a decrease in Surface Strategy.

*Hours of study effects.* Hours of study is a variable that shows interaction effects with three approaches to learning. In the case of the Deep Motivation and Deep Strategy scales there is no significant change in students who study more than ten hours outside of classes each week over the occasions of measurement. The lack of change would seem to indicate that these students continue to use memorisation as a learning tool as they did in their Confucian cultural environment. However, there is a strong interaction effect with the Achieving Strategy learning scale over time. This observation may result from a change in approach to learning that is necessitated by a difference in the methods of assessment practised in Australia. In Asian countries education is examination-dependent (Biggs, 1996; Tang, 1996; Tang and Biggs, 1996) whereas Western education tends to rely more on written assignments and oral presentations as the primary methods of assessment. This effect also shows that students who spend ten hours or less each week on study show an increase in Achieving Strategy over the occasions of measurement.

*Students' preferred language effects*. Students who speak English rather than their home language in their free time show a marginal, but significant decrease in Achieving Motivation whereas students who prefer to use their home or another language show an increase in Achieving Motivation. Speaking the home language may increase the students' confidence in their ability to study in a new social and cultural environment and have a positive influence on their motivation to achieve. It may also assist them to retain cultural ties with the country they expect to return to on the completion of their studies. Cannon (1999) has found this to be the case in his research. After a period of adaptation to the new language environment, even hesitant students are likely to show a stronger desire to learn and this may result in a further increase in Achieving Motivation.

*Effects of counties visited on students' learning*. Students who have travelled beyond the Asian region show a marginal, but positive interaction with the predictor variable Occasion and the outcome variable Achieving Strategy. Two factors are considered to have had an influence on the results encountered with this variable: (a) greater distances travelled and (b) travel for periods of a month or more. Travel of any kind gives individuals the opportunity to experience life in different living and learning environments. This may explain why students who have travelled beyond Asia also show a marginally higher level of Achieving Strategy compared with students who have only visited Asian countries that are physically, socially and culturally similar to their home living and educational environment. Ward and Kennedy (1993a, 1993b, 1999) have confirmed this in their research with students who travelled to different cultures and countries to live and study. This effect is reflected in an increase in Achieving Strategy over the occasions of measurement in this study.

## Summary

In summary, it may be noted that five of the six scales associated with learning show significant change over time. Surface Motivation generally decreases while the motivation and strategy scales associated with both the Deep and Achieving Approaches increase over the period in which measurements have been made. This information provides evidence that learning approaches change or are modified in some, but not all groups of CHC students in the Australian learning environment.

A key point in understanding why learning approaches changed was knowledge of the Australian teaching and learning environment. The Australian way of teaching appeared to be different to what students from Confucian cultures were accustomed to and it was this difference that seemed to be producing changes in some students' approaches to learning. This difference led to the question: why did some groups of students' approaches to learning change whereas some did not change and other groups' approaches to learning remained the same?

It would seem, therefore, that different teaching approaches and learning environments generated changes in motivations to learn that, in turn, required different learning strategies. Research by Watkins and Biggs (1996, 2001b) noted that Asian students previously considered surface learners often became deep learners if they encountered learning environments that encouraged and promoted this change. The results from similar longitudinal studies have been discussed in publications by Renshaw and Volet (1995); Volet and Renshaw (1994, 1995, 1996); and Volet, Renshaw and Tietzel (1994).

Two issues that have been raised by these particular results need further consideration. The results may be improved by a refinement in the research design. Two variables: hours of study and time of arrival in Australia have proved somewhat problematic. These variables could be measured on several and not a single occasion. This would enable closer monitoring of any alteration in particular variables that are likely to change over time.

## Conclusion

The observations noted were confirmed by the students in the study sample who generally showed a change to a deeper, more problem-based learning approach. The fact that the Surface Approach to learning generally decreased over the two years of the study at the same time as the Deep and Achieving Approaches increased indicated that some, but not all groups of students changed their approaches to learning.

Further, the motivation to achieve and the allied strategy that implements this motivation seem to be crucial factors to sojourner students from Confucian cultures. This knowledge necessitates a wider acceptance as well as a greater acknowledgement of overt and latent differences between individuals from different cultural groups. These findings and the concomitant appreciation of difference are of particular importance for individuals who are teaching and working with CHC students in Western learning environments.

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