

# **Relations between motivational goals, beliefs, strategy use and learning outcomes among university students in a distance learning mode: A longitudinal study**

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The study reported in this paper investigated the complex relationships between the motivation and cognition of university students in a distance learning mode. Few research simultaneously assesses why and how distance learners engage in learning. Using questionnaire items taken from established self-report instruments, Motivated Strategies for Learning Questionnaire and Study Process Questionnaire, distance learners' motivation (achievement goals, efficacy beliefs, control beliefs), self-regulated learning (time management, effort management, help-seeking, self-regulated strategies), and learning strategies (deep, achieving and surface) were assessed. In addition, distance learners' attitudes towards the course (enjoyment and values) and their course results were also collected. 431 distance learners enrolled in different academic programs offered by a distance learning university completed two survey questionnaires sent at the beginning and near the end of an academic year. Results showed that mastery goals and efficacy beliefs were the most important predictors in the use of different forms of self-regulated and learning strategies over time. In general, the findings lent support to the importance of multiple goals for university learning.

From a sociocognitive perspective, motivation and cognition are often treated as connected (e.g. Graham & Golan, 1991; Pintrich, 1989; Pintrich & DeGroot, 1990; Pintrich & Garcia, 1991; Pintrich & et al., 1993; Pintrich, Roeser, & DeGroot, 1994). The studies of achievement goals, by and large, follow this theoretical perspective. Using student samples, ranging from primary to tertiary levels, achievement goal researchers have clearly demonstrated that different achievement goals are associated with specific cognitive, affective and behavioral responses. Earlier studies provide evidence showing that mastery goals are primarily adaptive, relating positively to the use of regulatory strategies and other adaptive cognitive strategies leading towards deeper levels of processing. In contrast, performance goals are showed to have detrimental effects on learning outcomes as they are related negatively to the use of regulating strategies and cognitive strategies but positively to shallow processing strategies. Therefore, students oriented towards mastery goals tend to do relatively better than those oriented towards performance goals (e.g. Ames, 1992; Ames & Archer, 1988; Dweck, 1986; Greene & Miler, 1996; Meece, Blumenfeld & Hoyle, 1988; Nolen, 1988; Pintrich, 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991). While the adaptive nature of mastery goals has been generally accepted, debates over the motivational nature of performance goals have resulted in the revision of the dichotomous goal framework. Elliot and his colleagues (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) proposed a trichotomous goal framework, including mastery goals,

performance approach and performance avoidance goals. Their studies showed that performance goals only had deleterious effects when college students focused on avoiding showing low abilities (Elliot & Harackiewicz, 1996; Harackiewicz, Barron & Elliot, 1998). Bouffard, Boisvert, Vezeau and Larouche (1995) also found similar results with British colleague students. These theoretical debates and subsequent research findings have led prominent achievement goal researchers, such as Judith Harackiewicz and Paul Pintrich, to call for a revision of the normative goal theory (Harackiewicz, Barron, Pintrich, Elliot & Thrash, 2002; Pintrich, 2000).

While the general relationships between different types of motivational goals and strategies have been established, "there is a need for further replication and extension of these results with different samples" (Pintrich & et al., 2001). Previous studies of achievement goals involve mainly samples of students in a face-to-face mode of learning. Few studies have applied the achievement goal theory to students studying at a distance mode of learning.

Aside from the fact that achievement goals have seldom been studied among distance learners, there are several reasons why studying achievement goals with distance learners is meaningful. First, in line with a sociocognitive perspective on motivation and learning, it is assumed that distance learners' own perceptions of themselves and the learning environments will have influences on their goals and other associated construals (Dweck, 1986). Distance learners are usually described as goal-oriented. In other words, they will have clear purposes for taking distance learning courses or programs. In addition to academic interest, personal development, self-esteem and career advancement are the reasons commonly reported in the literature explaining why distance learners learn (e.g. Lyall, & McNamara, 2000; von Prummer, 1990). To learn for the sake of personal development, such as widening one's horizon, or some work-related considerations, such as, for the sake of getting promotion, can then be considered as alternative achievement goals specifically found among adult-distance learners, which should have implication on how they approach learning. Therefore, in addition to the commonly-tested achievement goals (i.e. mastery, performance-approach, and performance-avoidance goals), this study also examined goals specifically found among distance learners, including goals for personal development and work-related intentions.

The second reason why it is appropriate to apply the achievement goal framework to distance learners is related to the significance of strategies for distance learning. Abilities to regulate one's learning, manage effort and time, seek help from others in the right time, and to use appropriate strategies during the course of learning are considered critical in the process of distance learning (e.g. Brockett & Hiemstra, 1991; Garrison, 1997). Extant research has demonstrated that a sense of self-regulation and the use of strategies are essential for successful learning at a distance mode (Lyall & McNamara, 2000; King, Harner & Brown, 2000; Sankaran & Bui, 2001). However, empirical research relating these abilities to distance learners' motivation and learning outcomes is scant. Using an achievement goal framework, the influences of goals and strategies on learning among distance learners can be examined together.

Aside from achievement goals, distance learners' efficacy and control beliefs are also important motivational constructs that will have an impact on the use of strategies. When one feels more efficacious and believes that they are in control, they will be more likely to use strategies like self-regulation and time management to regulate their learning. The close relationship between different measures of efficacy and control beliefs and the use of adaptive strategies has been studied and confirmed (e.g. Ames & Archer, 1988; Miller & et al, 1993; Greene & Miller, 1996; Pintrich, 1989; Pintrich & DeGroot, 1990). Within the achievement goal framework, concerns have been focused on the interaction between efficacy beliefs and achievement goals. However, theoretical debates and associated

empirical findings related to this issue are far from conclusive (c.f. Dweck, 1986; Elliot & Dweck, 1988; Kaplan & Midgley, 1997; Miller, Brehrens, Greene, and Newman, 1993). Adding to the complexity of this issue is the notion of multiple goals. It is not known how different levels of efficacy interact with combined effects of mastery and performance goals or some other goals.

Given this concern about the interaction between efficacy and achievement goals, few studies simultaneously tested the relative strength of achievement goals and these motivational beliefs on the future use of strategies and learning outcomes. Greene & Miller (1996) found a path model showing that both efficacy beliefs and achievement goals predicted the level of cognitive engagement, which subsequently predicted the level of achievement. Archer (1994) in a series of regression analyses showed that mastery goals contributed to the prediction of the use of learning strategies, positive learning attitudes and task choice over and above the contribution of perceived ability and performance goals. Nevertheless, the predictive abilities of achievement goals versus efficacy beliefs on future employment of strategies and achievement levels cannot be determined from these studies as they were based on concurrent measurement of these variables. In other words, it is not clear the extent to which achievement goals, relative to other motivational variables such as efficacy and control beliefs, predict the future use of strategies. Using a longitudinal design, the current study aims to first explore the relationship between achievement goals, efficacy and control beliefs and the use of different types of learning strategies. In addition by weighting achievement goals against efficacy and control beliefs, the relative strength and unique contribution of these two sets of motivational variables on the future employment of strategies can be clarified.

Previous achievement goal studies usually test effects of achievement on single indicators. Barron and Harackiewicz (2001) theorized that it was important to test the effects of achievement goals on different learning outcomes because different achievement goals will have specialized effects on different outcome indicators. For example, mastery goals predicted the degree of interest and performance approach goal predicted the level of achievement in an introductory undergraduate psychology class (Harackiewicz & et al., 1997). However, the relative contribution of self-efficacy, control beliefs and the use of strategies have not been simultaneously tested and therefore, it was not known how the specialized effects of different goals weighted against other important learning variables. This study therefore tested the effects of motivational (goals and beliefs) and strategy variables on desirable learning attitudes towards a course, continuous assessment, and final examination results. The inclusion of different outcome indicators will be instrumental in differentiate the effects of different goals, beliefs and strategies in a longitudinal manner.

In short, using a sample of Chinese distance learners in Hong Kong, this exploratory study examined three major research questions about the relations between motivational variables (achievement goal, efficacy and control beliefs), the use of different strategies (self-regulatory, surface, achieving and deep strategies) and learning outcomes (attitudes towards a course, performance in continuous assessment, and final examination results):

1. What are the relationships between motivational goals, beliefs and the use of strategies over time among Chinese distance learners?
2. What are the relative strength and unique contribution of distance learners' motivational goals and beliefs in Time 1 (the beginning of a course) as a predictor of strategy use in Time 2 (the end of a course)?
3. What is the relative strength of motivational goals, beliefs, and strategies in Time 1 and 2 as a predictor of learning outcomes in Time 2?

## Method

### *Participants*

The participants in this study included 431 distance learners enrolled in various programs of study offered by the Open University of Hong Kong. These distance learners responded twice to a mailed survey within an academic year. Among these participants, 20.2% (N=87) were males and 77.5% (N=334) females. Most of the participants concentrated in age spans of 21-30 (32.5%; N=140), 31-40 (40.4%; N=174), and 41-50 (22.7%; N=98).

### *Measures*

A large cohort of distance learners (N=1200) were asked to respond to a self-report questionnaire twice, at the beginning and towards the end of an academic year about the course they took. 431 distance learners responded twice, yielding a response rate of 35.9%. All items were set in 5 point Likert scale (lowest: 1; highest: 5). The questionnaire assessed students' achievement goals, learning strategies, self-regulatory strategies, learning related beliefs and attitudes regarding the course as a whole (see Appendix 1 for samples of questionnaire items). Questionnaire items were worded to accommodate the nature of distance learning. Major questionnaire items for assessing mastery, performance-approach and performance-avoidance goals were adapted from the previous work of achievement goal theorists (e.g. Ames & Archer, 1988). Items assessing work-related goals were specially designed for this study. Items assessing learning strategies (deep, achieving and surface) were taken from Biggs' Study Process Questionnaire (1987). Items on self-regulated strategies, time and effort management, help seeking, efficacy and control beliefs were adapted from the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia & McKeachie, 1991). Learning outcomes were measured in terms of students' attitudes towards the course (assessed by 6 items), performance in continuous assessment (average score of 5 academic essays), and final examination results.

## Results

### *Major constructs*

To verify whether the items tested at both times conformed to the priori classification of achievement goals, two principle components factor analyses with varimax rotation were conducted. The selection criteria for inclusion in a factor were: first, item factor loading should be over .40; and second, items loaded on one factor only, i.e. without cross-loading in different factors. The analyses yielded a five-factor solution in both Time 1 and 2. Factor five in both times contained one item only and therefore was not interpreted. The remaining four factors reflected the priori classification of achievement goals among distance learners and were labeled as Mastery-development goals, Performance-approach goals, Self-assertive goals, and Work-related goals. The eigenvalues for Mastery-development, Performance-approach, Self-assertive, and Work-related goals were 4.46, 3.25, 1.71 and 1.21 respectively for Time 1, and 4.82, 3.33, 1.21 and 1.24 respectively for Time 2. The percentage of variance explained for Mastery-development, Performance-approach, Self-assertive, and Work-related goals were 22.30%, 16.27%, 8.58% and 6.07% respectively for Time 1, and 24.12%, 16.67%, 6.08% and 9.22% respectively for Time 2. Mastery-development goals were formed by items assessing goals related to mastering of knowledge and enhancing personal development. This mixture of items assessing mastery and development reflected that the notion of mastery for distance learners is closely related to personal development. Performance-approach goals were about showing one's ability and

getting good performance. Self-assertive goals were about building up confidence and proving one's ability. Work related goals were overtly about learning for the sake of enhancing one's career prospect through getting better professional qualifications or further developing one's professional knowledge. In general, these goal categories reflected the specific goals distance learners often embrace.

The construction of self-regulatory strategies, effort management, time management, help-seeking, efficacy beliefs and control beliefs followed closely those found in the MSLQ. Similarly, the construction of surface, achieving and deep strategies followed the SPQ framework. Factor analyses were considered not necessary for these scales adapted from established instruments. Attitudes towards the course were assessed by items on values and interest on the course. The items forming the constructs in this study were then tested for reliability in both Time 1 and 2 separately. Table 1 shows the results.

*The first question concerned the relations between motivational variables and the use of different strategies.* Table 2 summarizes the correlation between motivational variables, the use of different learning and regulatory strategies, and attitudes towards the course in both Time 1 and 2. As shown, mastery-development goals, relative to other goals in both Time 1 and 2, had a stronger relationship with various types of strategies, except help seeking strategies. The strongest correlation was between mastery goals and attitudes towards the course ( $r=.72$ ,  $r=.78$ ). This close link confirmed the intrinsic nature of mastery-development goals. In addition, mastery-development goals distinguished between adaptive and maladaptive strategies. They correlated positively with adaptive strategies but maintaining a negative relationship with surface strategies ( $r=-.28$ ,  $r=-.48$ ).

Performance-approach goals showed a similar adaptive pattern of relationship in the use of strategies. Specifically, performance-approach goals were negatively related to the use of surface strategies but positively related to the use of achieving, deep, and other regulatory strategies. It was interesting to note that performance-approach goals, relative to other goals, showed the strongest relationship with help-seeking strategies. This particular result suggests that seeking help may not be considered as a demonstration of low ability among Chinese distance learners. Performance-approach goals were also positively related to attitudes towards the course in both Time 1 and 2.

The relationships between self-assertive goals and strategy use were less clear-cut. On one hand, these goals maintained a positive relationship with adaptive strategies like achieving, deep, self-regulatory and time management; on the other hand they were positive associated with surface strategies. With these mixed results, it was difficult to conclude the motivational nature of self-assertive goals. However, these goals were positively related to attitudes towards the course in both Time 1 and 2.

Work-related goals were associated with the use of surface strategies positively in both Time 1 ( $r=.22$ ) and 2 ( $r=.24$ ). Distance learners with these goals also endorsed the use of achieving strategies. Work-related goals had a nonsignificant or relatively weak link with the use of deep strategies ( $r=.04$ , nonsignificant;  $r=.10$ ), self-regulatory strategies ( $r=.04$  nonsignificant;  $r=.13$ ), time management strategies ( $r=.01$ , nonsignificant;  $r=-.02$ , nonsignificant), effort management strategies ( $r=-.10$ ;  $r=-.06$ ), and help seeking strategies ( $r=.05$ , nonsignificant;  $r=.12$ ). These goals did not relate to any favourable attitudes towards the course ( $r=.09$ ;  $r=.09$ ). Taken together, these results suggested that work-related goals may be extrinsic in nature.

One general pattern of association was that motivational goals had a stronger relationship with the use of learning and regulatory strategies in Time 2, with exception in a few pairs. This phenomenon may be related to the timing of the second survey. With the examination

approaching, distance learners might have shown greater concern on their learning, which probably led to the development of a closer relationship between motivational goals and the use of strategies.

The pattern of association between efficacy beliefs, control beliefs and the use of strategies mirrored that of mastery-development goals. In other words, strong efficacy and control beliefs were associated with less use of surface strategies but more use of adaptive learning and regulatory strategies. These results suggest that distance learners with a strong sense of self-efficacy and control tend to use more adaptive strategies but less maladaptive strategies.

*The second question concerned the relative strength and unique contribution of motivational variables (Time 1) predicting the future use of strategies (Time 2).* Seven individual regression analyses were run. The different types of strategies in Time 2 were entered as dependent variables while motivational variables in Time 1, including efficacy and control beliefs as well as the four different types of achievement goals, were treated as independent variables entered in the same block. The results found 7 significant regression models, showing that motivational beliefs and goals successfully predicted the future employment of different types of strategies. Table 3 shows the results of these analyses. As shown, mastery-development goals were the most important predictors for surface strategies, deep strategies, self-regulating strategies, effort management, and help-seeking. Efficacy beliefs were the most important predictor for the employment of achieving strategies and time management. Performance-approach goals predicted positively the use of regulatory strategies but negatively the use of surface strategies, indicating that a concern for higher performance over time would not lead to any deleterious effects on strategy use. Work-related goals, however, were maladaptive overtime as they positively predicted the use of surface strategies but negatively predicted time management strategies. As for self-assertive goals, their effects overtime were still mixed.

To show that distance learners' achievement goals predicted the use of different strategies *over and above* that of efficacy and control beliefs, a series of regression was conducted. Efficacy and control beliefs were entered in the first step, and achievement goals followed in the second step. This order of entry would show how well achievement goals predict the dependent variables after the variance unique to the motivational beliefs has been accounted for. Table 4 shows the results and indicates that achievement goals made independent significant contribution to the total  $R^2$ , over and above the contribution of motivational beliefs. For surface strategies, effort management and helpseeking strategies, the contribution of achievement goals was more distinctive. In most cases, mastery-development goals were the major contributor to the additional account of the variance.

*The third question was about the relative strength of motivational and strategy variables in Time 1 and 2 as a predictor of learning outcomes in Time 2, including attitudes towards the course, and achievement levels shown in continuous assessment and final examination.* Six hierarchical regression analyses were conducted. Table 5 shows the results, which indicates that different learning outcomes were predicted by different variables. Mastery-development goals in both Time 1 and 2 strongly predicted distance learners' attitudes towards the courses at the end of an academic year. Efficacy beliefs in both time 1 and 2 predicted achievement levels shown in continuous assessment and final examination. Work-related goals in time 1 and 2 predicted the examination results. Effort management in time 1 and 2 predicted students' performance in continuous assessment. Distance learners' performance-approach goals in time 2 predicted their performance in both continuous assessment and examination results. The negative significant result of self-regulatory strategies predicting continuous assessment may be due to suppressor effect, as these two variables were not significantly correlated in both Time 1 and 2.

## Discussion

Using a longitudinal design, this study explored the relationships between motivational goals, beliefs, use of strategies and different learning outcomes. In terms of the relationships between motivational goals, beliefs and the use of strategies, it was found that the greater use of mastery-development goals were associated with a greater use of adaptive strategies. Performance-approach goals also showed a similar adaptive pattern strategy use, which is consistent with the revised perspective Elliot and his colleagues suggested.

The relationship between work-related goals and strategy use warranted more concerns. Comparing with the previous two types of goals, work-related goals showed a reverse pattern of relationship with strategy use. They predicted the use of surface strategies but negatively related or nonsignificantly related to the use of the adaptive strategies such as deep and self-regulatory strategies. However, interpreting these results as the case that distance learners with greater concern of their own career or professional advancement in learning will usually demonstrate a maladaptive pattern of strategy use seems problematic. There are two reasons preventing us rushing to this premature conclusion. First, the use of surface strategies among Chinese students might not necessarily be maladaptive. Previous studies in learning strategies show that high achieving Chinese students also endorse the use of surface strategies. In other words, surface strategies are within the learning strategy repertoire of Chinese students. The second reason is that work-related goals in this study positively predicted the final examination results. In other words, distance learners with career intentions had better results. What can then be deduced from the current results is that work-related goals may represent an alternative path to achievement (c.f. Pintrich, 2000), i.e. using surface strategies to gain better examination results.

The current findings also showed that different achievement goals will have specialized effects on different learning outcomes and attested to the importance of assessing the effects of individual achievement goals against different indicators of learning outcomes (Barron & Harackiewicz, 2001). Mastery-development goals predicted positive attitudes towards the courses but not the level of achievement as measured by continuous assessment and final examination. In contrast, performance-approach goals and work-related goals predicted achievement levels but not attitudes towards the course. These findings lent support to the optimal motivation hypothesis Barron and Harackiewicz proposed, which states that to be optimally motivated in a university learning environment, one needs to strive for high performance and simultaneously put effort and time to master the learning materials. The current findings provided evidence that a sense of efficacy will also contribute to the development of optimal motivation as efficacy beliefs predicted both attitudes and achievement levels over time.

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## **Appendix 1: Sample Questionnaire items**

### **Mastery-development goals**

- I enrolled in this course because I want to learn something new.
- I want to gain personal satisfaction

### **Performance-approach goals**

- In this course, I would like to show that I am more capable than other students
- I want to get a good result

### **Work-related goal**

- Because the knowledge is relevant to my job
- I want to gain the professional qualification

### **Self-assertive goals**

- Because I want to enhance my self-confidence
- I don't want people to think that I know nothing about this subject

### **Efficacy Beliefs**

- I believe I will receive an excellent grade in this class
- I'm certain I can understand the most difficult concepts and theories presented in the course

### **Control beliefs**

- If I study in appropriate ways, then I will be able to learn the material in this course
- If I try hard enough I will understand the course material

### **Surface strategies**

- I think browsing around is a waste of time, so I only study seriously what's given out in tutorials or in the course outlines
- I learn the materials in this course mainly by rote, going over and over them until I know them by heart.

### **Deep strategies**

- While I am studying this course, I think of real life situations to which the material that I am learning would be useful.
- In reading new material, I find that I'm continually reminded of material I already view before I am satisfied.

### **Achieving strategies**

- I'll try to work consistently throughout the semester and review the materials in the course regularly when the exam is close.
- I'll try to do all of my assignments as soon as possible after they are given out.

### Self-regulatory strategies

- During tutorials, I often miss important points because I'm thinking of other things
- When studying this course, I make questions to help focus my understanding

### Time Management

- I make good use of study time for this course
- I find it hard to stick to a study schedule

### Effort Management

- Even when study materials are dull and uninteresting, I manage to keep working until I finish
- I work hard to do well in this course even if I don't like what we are doing

### Help seeking

- When I don't understand the material in this course, I ask my tutor or others for help
- I try to identify students in my group whom I can ask for help if necessary

### Attitudes towards the course

- I think the materials in this course are relevant for my job
- Learning this course is enjoyable

**Table 1: Reliability Scores for Major Constructs**

Major Constructs	No. of Items	Reliability	
		Time 1	Time 2
Mastery-Development goals	8	.81	.83
Performance-Approach goals	2	.67	.66
Self-assertive goals	3	.65	.65
Work-related goals	5	.79	.80
Surface strategies	3	.55	.54
Achieving strategies	4	.70	.65

Deep strategies	4	.70	.71
Self-regulated strategies	8	.78	.77
Time management	2	.63	.67
Effort management	2	.63	.67
Help Seeking	2	.81	.79
Efficacy beliefs	3	.78	.71
Control beliefs	3	.70	.73
Attitude towards the course	6	.84	.85

**Table 2: Correlations between Motivational variables (achievement goals & motivational beliefs) and Strategy Use in both Time 1 & 2**

	Surface strategies		Achieving strategies		Deep strategies		Self-regulatory strategies		Time management		Effort management		Help seeking		Attitudes	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
<b>Mastery-development goals</b>	-.28*	-.48*	.35*	.42*	.49*	.60*	.31*	.41*	.22*	.21*	.19*	.38*	.10*	.13*	.73*	.79*
<b>Performance-approach goals</b>	-.08	-.10*	.18*	.36*	.21*	.35*	.25*	.39*	.15*	.20*	.18*	.23*	.15*	.17*	.15*	.23*
<b>Self-assertive goals</b>	.12*	-.01	.21*	.25*	.15*	.31*	.12*	.24*	.11*	.11*	-.01	.12*	.02	.08	.21*	.31*
<b>Work-related goals</b>	.22*	.24*	.13*	.13*	.04	.10*	.04	.13*	.01	-.02	-.10*	-.06	.05	.12*	.09	.09
<b>Efficacy beliefs</b>	-.25*	-.17*	.45*	.42*	.43*	.45*	.43*	.39*	.36*	.29*	.23*	.21*	.26*	.25*	.50*	.47*
<b>Control beliefs</b>	-.23*	-.18*	.35*	.23*	.36*	.40*	.34*	.21*	.18*	.11*	.26*	.20*	.21*	.14*	.45*	.52*

\*\* Correlation is significant at the 0.01 level (2 tailed)

\* Correlation is significant at the 0.05 level (2 tailed)

T1= Time 1; T2=Time 2

**Table 3: Standardized Regression Effects of Time 1 Motivational Variables on Time 2 Strategy Variables**

Predictors	Surface strategies	Achieving strategies	Deep strategies	Self-regulatory strategies	Time management	Effort management	Help seeking
Mastery-Development goal	<b>-.33***</b>	<b>.13*</b>	<b>.33***</b>	<b>.21***</b>	.09	<b>.18***</b>	<b>.11*</b>
Performance-approach goals	<b>-.10*</b>	.05	.07	<b>.12**</b>	.08	.05	.07
Self-assertive goals	<b>.14**</b>	.07	.02	.04	<b>.11*</b>	-.04	-.02
Work-related goals	<b>.23***</b>	-.04	-.01	.03	<b>-.18**</b>	<b>-.17**</b>	.07
Efficacy beliefs	-.03	<b>.26**</b>	<b>.17**</b>	<b>.18**</b>	<b>.23***</b>	.07	.06
Control beliefs	-.09	-.01	.03	-.02	<b>-.12**</b>	-.03	.03
Total Adjusted R <sup>2</sup>	<b>.19***</b>	<b>.12***</b>	<b>.20***</b>	<b>.13***</b>	<b>.09***</b>	<b>.06***</b>	<b>.03***</b>

\*\*\* p<.001; \*\* p<.01; \* p<.05

**Table 4: Changes in Standardized Regression Effects (Efficacy and Control Beliefs entered in step 1 and Achievement goals in step 2)**

	Surface strategies	Achieving strategies	Deep strategies	Self-regulatory strategies	Time management	Effort management	Help-seeking strategies
Efficacy Beliefs	-.08	.32***	.28***	.28***	.27***	.10	.12**
Control Beliefs	-.15*	.01	.08	.01	-.09	.01	.04
<b>R<sup>2</sup></b>	<b>.04</b>	<b>.11</b>	<b>.11</b>	<b>.08</b>	<b>.05</b>	<b>.01</b>	<b>.02</b>
Efficacy Beliefs	-.02	.26***	.17**	.17**	.23***	.07	.06
Control beliefs	-.09	-.01	.03	-.02	-.12**	-.03	.03
Master-development goals	-.33***	.13**	.33***	.21***	.09	.18***	.11*
Performance-approach goal	-.10*	.05	.07	.12**	.08	.05	.07
Self-assertive goals	.14**	.07	.02	.04	.11*	-.04	-.02
Work-related goals	.23***	-.04	-.01	.03	-.18**	-.17***	.07
<b>R<sup>2</sup> Increment</b>	<b>.16</b>	<b>.03</b>	<b>.10</b>	<b>.06</b>	<b>.05</b>	<b>.06</b>	<b>.02</b>
<b>Total R<sup>2</sup></b>	<b>.20</b>	<b>.14</b>	<b>.21</b>	<b>.14</b>	<b>.10</b>	<b>.07</b>	<b>.04</b>

\*\*\* p<.001; \*\* p<.01; \* p<.05

**Table 5: Standardized Regression Coefficient (Motivation and Strategy Variables in Time 1 & 2 onto Learning Outcome indicators)**

	Attitudes towards course		Continuous assessment		Final Examination	
	T1	T2	T1 (note 1)	T2	T1 (note 2)	T2
<b>Mastery-development goals</b>	<b>.50***</b>	<b>.66***</b>	-.03	-.06	-.10	.002
<b>Performance-approach goals</b>	-.08	<b>-.07*</b>	.04	<b>.14*</b>	.03	<b>.12*</b>
<b>Self-assertive goals</b>	<b>-.10*</b>	.02	.05	-.06	.03	-.04
<b>Work-related goals</b>	.01	.05	.003	.06	.13 (p<.05)	<b>.22***</b>
<b>Surface strategies</b>	.03	-.05	-.04	-.06	-.03	.01
<b>Achieving strategies</b>	.02	.02	-.01	-.02	-.02	-.05
<b>Deep strategies</b>	.11	.03	-.04	-.03	-.03	.04
<b>Self-regulatory strategies</b>	-.03	-.001	-.05	<b>-.18**</b>	-.03	-.12
<b>Time management</b>	-.04	.01	.03	-.04	-.04	-.03
<b>Effort management</b>	.10*	-.02	.13 (p<.05)	<b>.17**</b>	-.06	.08
<b>Help-seeking</b>	.05	.02	.09	.10	-.06	-.04
<b>Efficacy beliefs</b>	<b>.11*</b>	<b>.17***</b>	.14 (p<.05)	<b>.26***</b>	.15 (p<.05)	<b>.18**</b>
<b>Control beliefs</b>	.05	<b>.08*</b>	-.07	.04	-.06	-.05

\*\*\* p<.001; \*\* p<.01; \* p<.05; Significant Beta values highlighted

Note 1: Regression Equation (Time 1 variables predicting continuous assessment) was non-significant.  $F(13, 405)=1.68$  ( $p=.06$ ).

Note 2: Regression equation (Time 1 variables predicting examination results) was non-significant.  $F=(13, 396)=1.59$  ( $p=.12$ )