Exploring the relationship between Learning Strategies, Self-management and the Learning Efficiencies- Example of Undergraduate Student's Learning in Taiwan

Kun-Hsi Liao

Dept. of Product Development and Design, Taiwan Shoufu University
No. 168, Nanshi Li, Madou Dist., Tainan City, 72153, Taiwan

Email: liaokunh@gmail.com

Abstract

In recent years, undergraduate students have shown low academic motivation and low academic performance in Taiwan. The reasons may be due to the large number of universities, the high rate of admissions, and lack of management education. Higher education is imperative in enhancing the student's will to learn and improve their academic performances. This study used "management theory" and modern psychology theory of "cognitive strategy", to exploring the relations of strategy, management and performance on the period of academic learning. The study selects undergraduate students as example to explore the relationship between learning strategy (Ls), self-management (Sm) and the learning efficiency (Le) in the student's academic learning. A total of 283 undergraduate students from Taiwan were voluntarily participated this study, and the SPSS and LISREL software were used for data analysis. The Ls variable includes two indicators, cognitive strategy (CS), and meta-cognitive strategy (MCS), and the Sm variable includes two items, resource management (RM), and time management (TM). The dependent variable Le includes two indicators; academic records (AR) and course pass credits (CPC) that were used to evaluate the learner's achievements in the semester. The results showed that the Le depended on the personal Ls and Sm. The AR was correlated with CS ($r = 0.274$, $p < 0.01$), MCS ($r = 0.321$, $p < 0.01$), RM ($r = 0.403$, $p < 0.01$), and TM ($r = 0.313$, $p < 0.01$). Student's learning style, time of reading per week and the causal relationship (LISREL) between Ls, Sm and Le were also exported in this study. Based on the results, learner's academic performances were closely with their self-management, especially with the "resource management", and "time management". It was strong suggested that in order to promote the academic performance, educator needs firstly to improve student's self-management ability. Conclusively, all of the findings in this study would provide a reference for student's learning, and organization learning.

Keywords: learning strategy, cognitive strategy, meta-cognitive strategy, resource management, time management, learning efficiency, organization learning

1. Introduction

In recent years, learning efficiency has emphasized that individuals' strategies and managements play an important role in learning approaches and learning outcomes (Tsai & Lin, 2008). How to improving the learning skills, and in advance to raise learner's outcomes are not only the organization manager needed to argue but also the school educators should be issued (Liao, 1999). Otherwise, from the school aspects, students like as organization employee, they also need adopting an efficient strategy

to finish their academic learning. The theory that used in the school learning would be seemly variable utilization in the business enterprises.

In recent years, undergraduate students in Taiwan have shown low academic motivation and low learning efficiency that caused the decreasing in academic performance. The reason may be due to lack of individual management learning. Higher education is imperative in enhancing student's learning skill, and improving academic performances. This study used "management theory" and modern psychology theory of "cognitive strategy" to depict a learning model to exploring how the individual personal learning strategies and self-management skills affects the learning efficiency in the period of university academic learning. Clearly, the purpose of this study was investigated the causal relationship between learning strategy, self-management and learning efficiency. The findings would be provided the references of student's learning, and organizational learning.

2. Literature View

2.1 Learning Efficiency

Learning efficiency is the base of organizational learning. Efficiency of *learning* was one of the most important factors that affect the organization learning. In order to improve the learning efficiency, managers in business and educators in school should be firstly considering the progressing to promote the learning method which would be then affected the learning outcome. Learning efficiency is also the foundation of learning management. It has established itself as a new field in management and organizational studies over the last 40 years (Steve, 2009). The influence of the idea of learning as a fundamental organizational process has been remarkable, as has the speed of its development and spread (Robert & John, 1996). How to improve the learning efficiency was an important issue in the business organization. There were many learning models depicted to explore the learning efficiency/outcome during last four decades. Tsai & Lin (2008) argued that learners' conceptions of learning play an important role in learning approaches and learning outcomes. Otherwise, understanding and seeing in a new way to improve ones learning efficiency were probably the management strategies used to assess his/her outcomes (Gottfried, 2010).

2.2 Learning Strategy

Learning strategy is about all the activities that learner used to promote their learning efficiency and to finish their academic goals. From the cognitive psychology, learning strategy can be divided into two categories, cognitive strategy and meta-cognitive strategy (Anderson, 1990).

2.2.1 Cognitive Strategy

Cognitive strategy may be one of the familiar learning strategies that depicted in cognitive psychology. It has adopted from the information-processing approach (Anderson, 1990). Cognitive strategy is used to information-process to strengthening the learning efficiency. Araujo (1998) argued that cognitive metaphors are the contents of cognitive strategy. Cognitive strategy can be divided into two categories, the basic and complicated (Weinstein & Mayer, 1986). Mayer (1986) argued that the

rehearsal, organization, and elaboration were three kinds of reading strategies that could help cognitive learning. Critical thinking is another cognitive strategy. Critical thinking is the process that learner used previous knowledge to evaluate and to critic his/her new learning contents (Garcia & Pintrich, 1995). Summarily, the above views, cognitive strategies have seemly including 4 indicators, rehearsal, organization, elaboration, and critical thinking.

2.2.2 Meta-cognition Strategy

Meta-cognition strategy is another strategy used in learning. Meta-cognition is a "cognitive awareness", and is a capacity that learner could be known and used to their own "knowledge and cognitive strategies". Weinstein & Mayer (1986) indicated that students used meta-cognition strategy to control and adjustment their learning strategies. Meta-cognition should be included three items, plan, monitor, and adjustment (Garcia & Pintrich, 1995). Gray (2007) argued the critical reflection is approximately one of most important meta-cognitive strategy in the learning processes. There were many empirical researches described that learning strategy were had a positive effect on academic achievement (Lent, et al., 1984；Pintric, 1987；Trawick, 1988；Pokay & Blumenfeld, 1990；Printric & De Groot, 1990；Wilhite, 1990；Zimmerman & Martines-Pons, 1990；Hirumi & Bowers, 1991；Qingquan, et al., 2008；Shell, & Husman, 2008).

2.3 Self-management

Self-management is one of the factors that can affect the learning efficiency. Self-management strategies can be divided into two categories, resource management and time management. Catherine et al. (2006) argued that learning is not just about the acquisition of knowledge but is an activity contributing to change and enrichment of the individual. Efficiency learning needs to builds on the interrelationships between three themes: individual and collective learning in groups; conversational learning; and the role of technology as an aid to learning. In other words, efficiency learning needs to seek outside resources and peer's cooperation. Those strategies are categorized as "self-management".

2.3.1 Resource Management

From the direction of learning behavior, self-management strategy, known as the "resource management". Such strategies are the resources available to students for environmental management (Corno, 1989). Cortese (2005) indicated that the utilization of internal resources were to be found in the current method of planning managerial training. Utilization of internal resources was one of the important individual self-management strategies used in learning. Roseth et al. (2008) indicated that higher achievement and more positive peer relationships were associated with cooperative rather than competitive or individualistic goal structures. Peer cooperative learning is the one of self-management strategies in used. Garcia & Pintrich (1995) proposed resource management strategy should include four items: time management, hard work, peer learning, and studied for assistance.

2.3.2 Time Management

Management guru Peter Drucker said: "time is the shortage of resources, unless it is managed, otherwise nothing management". Time is the most limited human resources, used properly can increase our productivity. Time management is the significance of self-management in education（Mudrack, 1997）. Martin & Osborne (1989）indicated that time management strategy should be included, setting up personal goals, taking into account their priorities, decision time frames for completion at all stages, using the stage plan calendar, and complete the priority objectives at all stages, in order to reduce the waste of time to a minimum. Time management directly related to the level of academic achievement (Moor, 1994；Trueman & Hartley, 1996). Summarily, there were seldom to take learning strategy, self-management into account to depict the relation with learning efficiency. In order to understand the influence factors of learning efficiency, this study firstly adopts a model to explore the causal relationship between of them.

3. Methodology

3.1 Framework of Research

According to the above views, this article sets up a learning model, as shown in Figure 1, to explore the causal relationships among learning strategy, self-management and learning efficiency. It was further verified by LISREL (linear structure relationship) testing (Jöreskog & Sörbom, 1993a, b). The model includes three latent variables and six observed variables. Three latent variables were Ls, Sm, and Le. Six observed variables were CS, MCS, RM, TM, AR, and CPC.
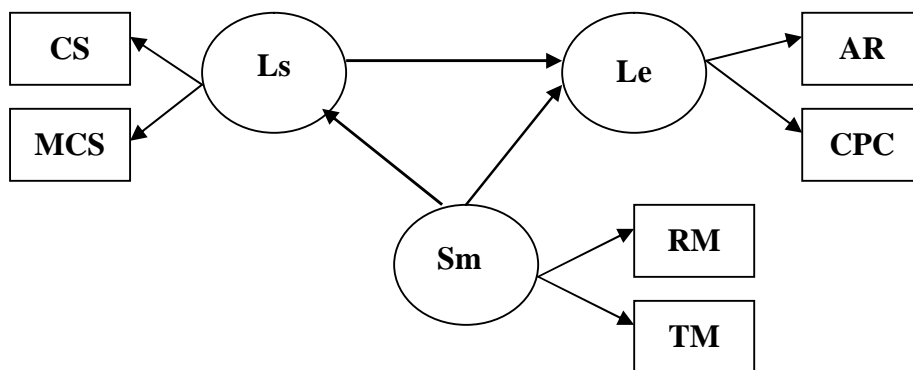

Figure 1. Proposed linear structure relationship model

Hypotheses of this research are as follows:

    H1： Learning strategy is correlated with learning efficiency.
    H2： Self-management is correlated with learning efficiency.
    H3： The casual relationship model among learning strategy, self-management
         and learning efficiency is proposed as Figure 1.

3.2 Sample and Data Collection

A total of 283 (148 males and 135 females) undergraduate students from Taiwan Shoufu University were voluntarily participated this study. They had taken at least one

semester course in the School. Data was collected using a questionnaire that designed according to a combination of past studies (Mayer, 1986；Corno, 1989；Martin & Osborne, 1989；Garcia & Pintrich, 1995；Liao, 1999). Content of the questionnaire consisted of three parts; "Learning strategy", "Self-management", and "Subject information". The central goal of the questionnaire was for understanding the general situation of the learning strategies used in the period of semester academic learning. Questionnaire was scored by means of a Likert 5 point scale. It consists of 70 items, divided into 3 parts, 31 learning strategy items, 29 self-management items, and 10 subject information items.

3.4 Data Analysis

Data analysis was used SPSS 17.0 and LISREL 8.2 statistical software package (Jöreskog & Sörbom, 1998). Data analysis was categorized into five portions, reliability, validity, demography, correlation, and LISREL model testing.

4. Result and Discussion

4.1 Reliability and Validity

Reliability was used Cronbach's (α) coefficient to present the internal consistency of questionnaire items. The reliability coefficient of internal consistency of CS, MCS, RM, and TM were .911, .783, .755, and .692, respectively. All reliabilities are higher than 0.50. More specifically, the reliability of sub-questionnaires was seemly excellent (Nunnally, 1967). Questionnaire validity was used TDCT (Two-way Detailed Catalogue Table) method to construct the content validity. TDCT method was firstly defined the meaning of variables, then listed the corresponding items of questionnaire, and finally, checking and refining the definitions and items by three experts to finish the reasonable questionnaire content validity.

4.2 Subject Information

Subject Information was statistically presented the distribution of subject's demography. Distribution of age levels were found lie between 17-31 years. Samples were comprised of all departments and all grades' student in the School. Subject's reading time per week, 1-3 hr/week accounts for the most, constituting 42.0%; less than 1 hr/week accounted for 39.6%. Subject's preparing examination methods, "reading text book" showed the most, constituting 82.0%; "reading notebook" was next, constituting 79.5%. Average of academic performance, 80-90 point level was the most, constituting 43.8%; 70-79 point level was second, constituting 34.6%. As the subject's demography showed, the distribution of samples based on gender, age, grade, and department were seemingly balanced. It was comprised of various levels of population; the sample seemly satisfied statistical demands. It is suitable for use on the linear structural relation model testing.

4.3 Correction Analysis

Correction analysis used Pearson's correlation coefficient to illustrate the relevant relationships among the five variables cognitive strategy, meta-cognitive strategy, resource management, time management, and learning efficiency. The correlation coefficient was shown in Table 1.

Table 1. Correlation coefficient of cognitive strategy, meta-cognitive strategy, resource management, time management, and learning efficiency

	cognitive strategy	meta-cognitive strategy	resource management	time management
learning efficiency (AR)	.274(**)	.321(**)	.403(**)	.313(**)

** $p < .01$ (two tail).

Table 1 showed the correction coefficient of cognitive strategy, meta-cognitive strategy and learning efficiency was .274 ($p < .01$), and .321 ($p < .01$) respectively, depicting the two factors to be positively related. This result entirely conformed to hypothesis (H1). The correction coefficient of resource management, time management and learning efficiency was .403 ($p < .01$), and .313 ($p < .01$) respectively, identifying the two factors as positively related. This entirely conformed to hypothesis (H2).

4.4 LISREL Model Testing

The LISREL (liner structure relationship) analysis inquired about the reciprocated and complementary influence effect of three variables, learning strategy, self-management, and learning efficiency (Jöreskog & Sörbom, 1993a). Concerns about multifactor causal relationships were suitable for utilizing the LISREL instrument (Jöreskog & Sörbom, 1993b). LISREL outputs were described as below, including the overall model and internal model fitting, as well as analysis of the discussion of test result. In addition, discussion of the actual example was presented.

4.4.1 The Overall Model-Fitting Test

This research used the maximum likelihood method to carry out the LISREL program (Jöreskog & Sörbom, 1998). The output of the overall model-fitting diagram was shown in Figure 2. As shown in the outputs, the fit indices for this model, chi-square (χ^2) was 2.13 with 4 degrees of freedom；goodness-of-fit index (GFI) = 0.998; adjusted goodness-of-fit index (AGFI) = 0.987, and standardized root mean square error of approximation (RMSEA) = 0.01. Hence, this model fits the data very well (Jöreskog & Sörbom, 1993a). In conclusion, the fit estimates were all ranged within a reasonable scope (Schumacker & Lomax, 1996). The overall model fit the data very well.
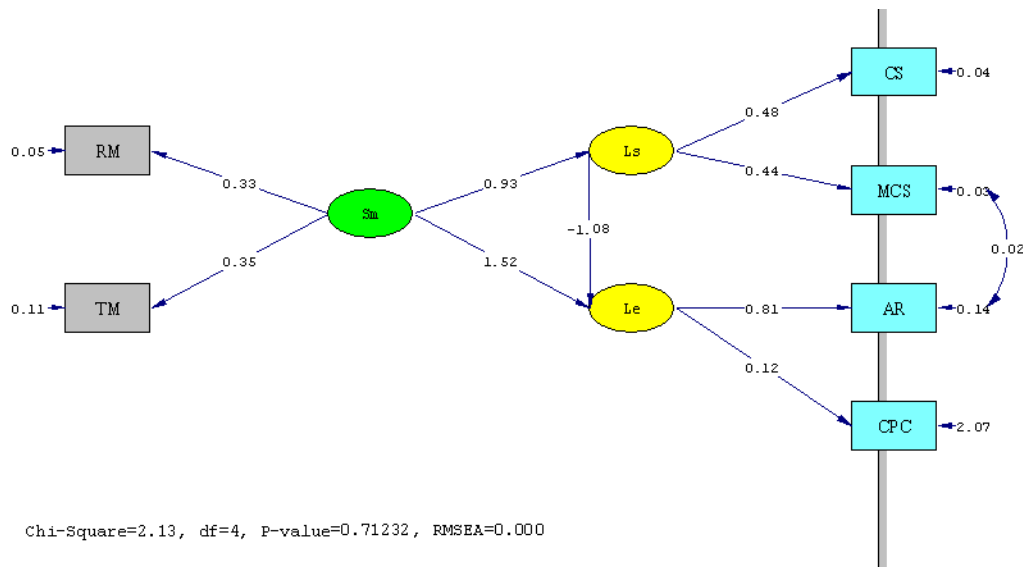
Chi-Square=2.13, df=4, P-value=0.71232, RMSEA=0.000

Figure 2. Diagram of LISREL model testing output

4.4.2 Brief Summary

The study used the LISREL method to test the proposed model. As the output shown that the overall model-fitting test was all fit the data well. In summary, the hypothetical model, Figure 1, that this study has proposed, tested by LISREL instrument, concluded a correct verification. This result entirely conformed to hypothesis (H3). That means the casual relationship model among learning strategy, self-management, and learning efficiency is liked Figure 1 shown. Otherwise, the learning strategy adopted the cognitive strategy and meta-cognitive strategy as observed variables being suitability; self-management adopted the resource management and time management as the observed variables being suitability; and learning efficiency adopted the academic records and course pass credits as observed variables being suitability.

5. Conclusions

This result indicated that the theoretical structure of the framework of this research proposal had been verified by the data. Based on the above results, it was concluded that the learning strategy and self-management have a direct relation with learning efficiency. These findings were in accord with the results of studies by preceding authors (Wilhite, 1990；Moor, 1994；Garcia & Pintrich, 1995；Trueman & Hartley, 1996；Qingquan, Chatupote & Teo, 2008；Shell, & Husman, 2008；Tsai & Lin, 2008 Wang & Holcombe, 2010). At the same time, the study also found that the self-management could have an indirect effect on learning efficiency through learning strategy. Therefore, this research inferred that self-management might be the prominent factor of learning efficiency. In the student and employee's study, wherever, self-management may be proposed as antecedents of learning strategy, with its effect on learning efficiency by learning strategy. Therefore, the results of the present study can provide a reference for student's learning, and organizational learning.

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